THE IRON AGE

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Capitalizing a Depression

CAPACITY for successfully coping with unusual and difficult situations has always characterized the management of American industry. Even after the softening effect of our longest prosperity period, when the test has come, the fine qualities of initiative, resourcefulness and courage have assembled to meet it.

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THE foundations of prosperity are laid in time of depression. It is during periods of industrial relaxation that attention can be focused on eliminating wastes and inefficiencies that were undetected so long as business was rolling easily along the smooth highway of flush demand. Indeed, it is safe to say that the recurring periods of depression which American industry has experienced have done more for its strengthening and upbuilding than have the longer periods of prosperity.

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PROGRESSIVE American metal-working executives are making the most of this present opportunity. The events of the past year have taken a good deal of the "cocksureness" out of industry. Its personnel is in a more receptive mood for self-examination and constructive criticism than for many years past. Executives are taking advantage of this favorable psychological atmosphere to make a thorough interrogation of every phase of company activities. They are "putting the question mark to work."

Widespread efficiency gains are being made that were not thought possible a year ago. They are not confined to any single phase of activity but cover the entire range from sales to production methods. Specific records of the results of this "forward managerial movement," as set forth in THE IRON AGE, indicate that the alert and progressive section of industry is rapidly placing itself upon a new and higher efficiency basis.

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IT is significant that lower costs and reduced expenses are being obtained through the betterment of operating methods and the improvement of equipment rather than through the reduction of wage rates. Not one of the instances of successful reorganization of manufacturing methods that have come to our attention has involved the reduction of existing wage rates. A recent survey of the membership of the National Association of Manufacturers reveals that 82 per cent of those reporting have maintained their wage scales unchanged from last year.

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DEPRESSIONS cannot continue indefinitely in the face of constructive action of this sort. The solid foundations are now being laid for industrial recovery and for the building of substantial future progress.

MR. GIFFORD is the president of Gifford-Wood Co., of Hudson, N. Y. His company manufactures handling equipment for coal storage and ice plants. Although these industries, like most others, suffered from the depression, Gifford-Wood Co. did as much business in six months of this year as in all of 1929. This accomplishment was due to the intensive use of the executive question mark.

"We Have Found the Question Mark a Powerful Tool"

IN one way, the toboggan slide has been a good thing for business, in that it has focused the spotlight on faults. The business man who ignores these faults, or the executive who dismisses them lightly, is simply blinding himself to the inevitable.

We have applied the question mark to every department of our business and to every shop in our plant. As a result our plant has worked overtime, or on two shifts, the greater part of the late spring and summer. That, I think, is as good an example of the power of intensive executive questioning as any that could be given.

BENEDICT GIFFORD.

How We Put the Question Mark to Work

By BENEDICT GIFFORD
President, Gifford-Wood Co.

FOR the few years preceding the toboggan slide upon which business involuntarily found itself last fall, most manufacturers, in which we ourselves were included, found that business was comparatively easy to get; that it was generally readily paid for; that long terms and innumerable discounts were asked for as a matter of habit, but insisted upon only in exceptional cases, and in general it was a free and easy life. Dividends made their regular appearance; stockholders were in fancied security, workers were busy, and all in all the picture quite nearly approached the average business man's idea of a business Utopia.

The autumn of 1929 was much like a large waterfall, where in a few brief moments a smooth, swiftly flowing stream is transformed into a mad and jumbled cascade, which pictures exactly what happened to industry at large.

The problem ever since has been to find another river bed wherein the jumbled waters can smooth out and flow powerfully toward the sea of good business.

Continuing the illustration, in our business (which designs and erects coal storage plants and engineers conveying equipment for the ice industry) as soon as we recognized the collapse which had so swiftly crept upon industry, we began to use your question mark in this way:

A waterfall in business is only a calamity until some means of controlling the fall can be found and, of course, we have the illustration of great hydroelectric utilities which turn waterfalls to their advantage by piping the water and using the head to operate turbo-generators which produce two million or more horsepower each month in this country.

Our problem, as was the problem of all business, therefore was, by eternally asking "Why?" to build a pipe line which would enable us to control the power that was running wild.

MR. GIFFORD was in Europe when we invited him to participate in the Round Table Conference on this subject, published in THE IRON AGE of Sept. 4. Upon his return, he prepared this account of his experience in using the question mark as a management tool during the depression.

As a result of its use, his business during the first half of 1930 was larger than for the whole of 1929.

Space, I presume, will not permit all details, but it will be interesting to you to know that by asking "Why?" in our advertising department, we re-formed and regenerated our policy; departed from tried methods and adopted a trenchant and aggressive tone which would not admit that there was such a thing as a business depression. Constant iteration, they say, carries the point. We have found that the answer to that "Why?" was just that. Interest in our products was new, fresh, immediate and widespread. The two industries with which we are affiliated became more and more familiar with our work.

As this was going on, another "Why?" was being asked in our sales department, resulting in a complete revamping of our sales methods; the institution of a new and complete form of salesmen's compensation; the introduction of new sales approaches and methods and a general wakening and revivifying of a sales force which found itself welded into a single, hard-hitting group.

The Why's extended into every department of our business and into every shop in our plant. The result was that rearrangements of machinery contributed to a more orderly and progressive flow of work through the shops. Additional space was found for new machines; shop departments were re-located in a more efficient manner; and nothing was permitted to interfere with the most efficient flow of work.

Inasmuch as several major departments of our business, including sales, engineering, production and construction, are involved in the completion of an order, the answer to one "Why?" was the institution of a planning department. Its function is to take each order as it is received, gage the amount of work it requires, assign the proper amount of time for each department's activities on that order, and to follow it through in order to make sure that schedule dates are met. This department has

SUGGESTIVE EXECUTIVE QUESTIONNAIRE

1—Have we increased our advertising efforts in the aggressive determination to fight effectively for more business?

2—Can we increase the hitting power of our sales effort by the introduction of new sales approaches keyed to today's conditions?

3—How long has it been since the machinery in our plant departments has been studied with the view to more effective arrangement?

4—Are we securing a "balanced output" from office employees? Have we made studies of the work done at each desk, so as to detect "under- and over-loading"?

5—Is our entire organization now pulling together as a unit with each department exerting its utmost to contribute its share toward company progress? Which department has made the greatest advance in this direction during the past year? Which one the least?

more than justified itself, as it was found possible to cut many days' time here and there in the completion of an order.

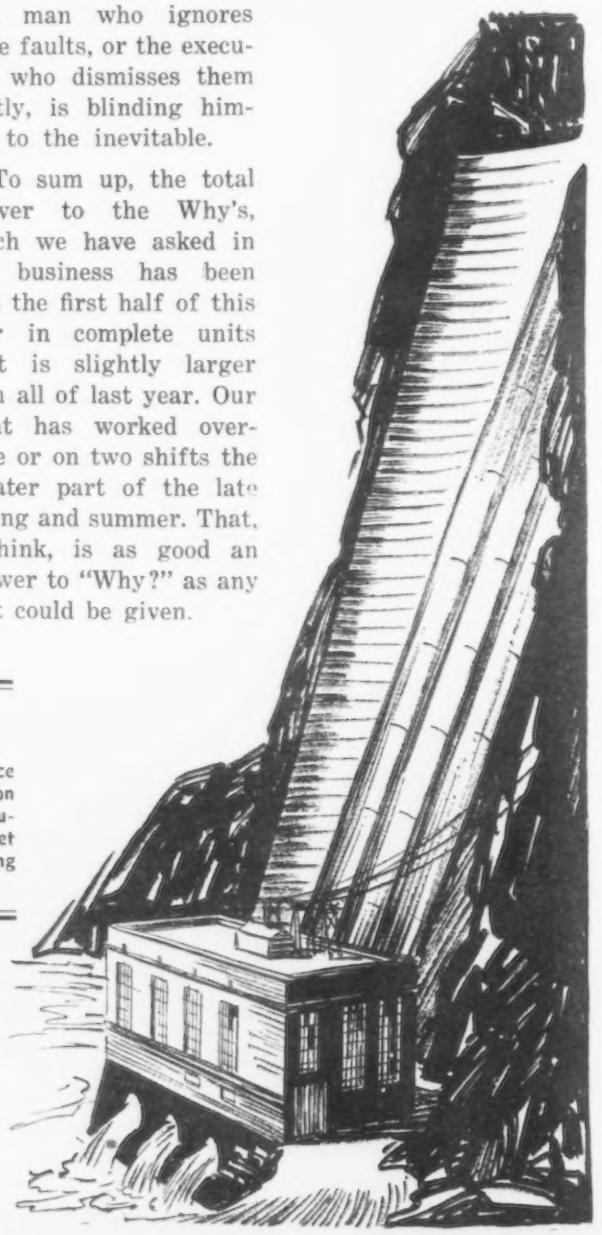
In this connection, it is necessary to point out that an order for a coal storage and handling plant involves considerable engineering and a great deal of planning in order that all the components which make it up, such as electrical equipment and steel, be completed on time and right.

Another Why in our steel shop was asked relative to riveting and the answer has been the institution of as complete welding operations as possible and the elimination of considerable riveting. This has not only speeded up work, but has also effected numerous economies and resulted in a smoother, stronger and better looking finished product.

Why's in our cost and accounting departments have also brought economies and greater efficiency. A Why was asked in regard to our personnel and in some cases we have found it possible to combine the work of two desks at no sacrifice of time or efficiency. In the main, however, I would say that numerical personnel (outside of the shops, of course) was almost a steady mean and that our main objective has been to secure a greater amount of more efficient work from each of our employees.

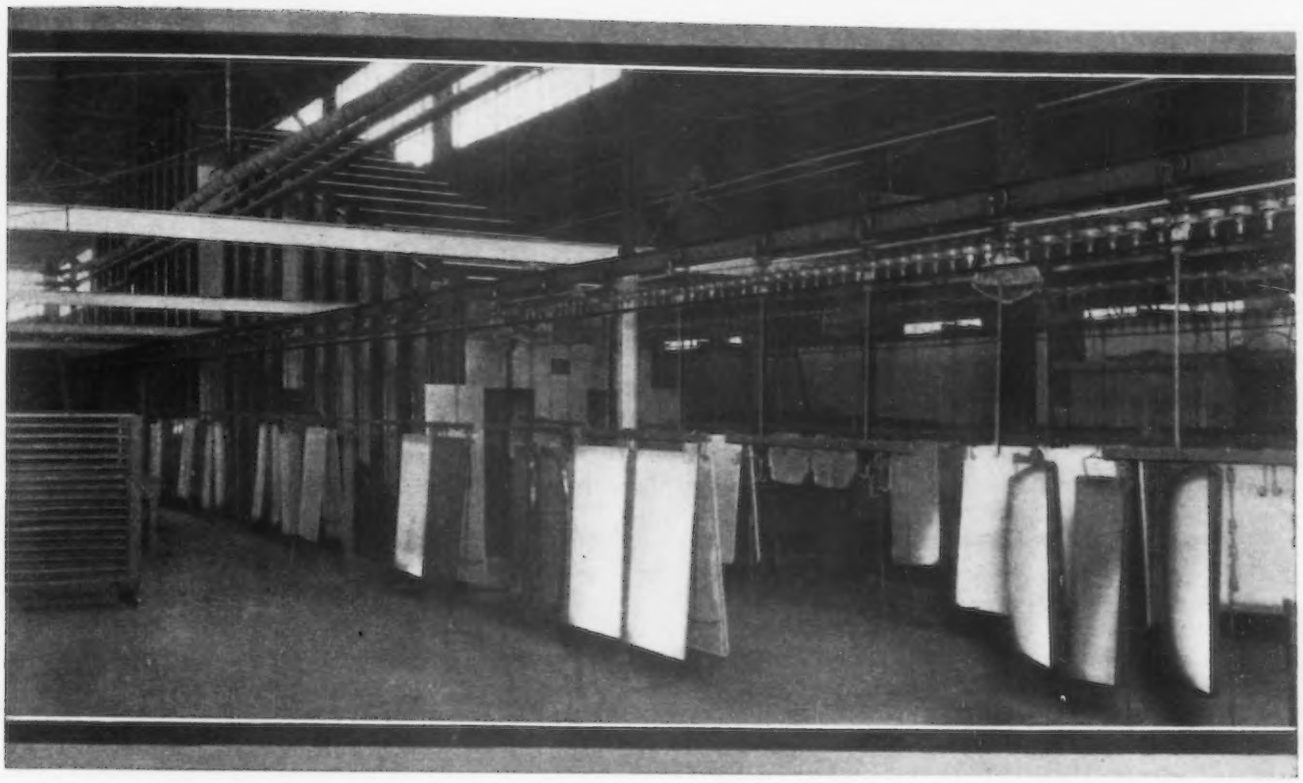
In one way the toboggan slide has been a good thing for business in that it has focused the spotlight on faults. The business man who ignores those faults, or the executive who dismisses them lightly, is blinding himself to the inevitable.

To sum up, the total answer to the Why's, which we have asked in our business has been that the first half of this year in complete units built is slightly larger than all of last year. Our plant has worked overtime or on two shifts the greater part of the late spring and summer. That, I think, is as good an answer to "Why?" as any that could be given.



ANNOUNCING ANOTHER ROUND TABLE

THE next Round Table Conference will be held in THE IRON AGE on October thirtieth. Six prominent executives will discuss Cost Policies to meet today's conditions in the metal-working industry.



Better Enameled Goods at Lower Cost Follow Use of New Equipment

MODERNIZATION of its plant and equipment recently has been effected by the Enamel Products Co., Cleveland, through installation of a continuous conveyor-type electric furnace of a new design for burning vitreous enamel, and by the addition of other new equipment, including a conveyor type of dryer, spray booths, overhead conveyors for handling work in process and an overhead handling and distributing system for enamel.

Work passes in a straight line through the new double-end furnace. There is a double firing chamber with independent control, permitting work to be burned in the two chambers, at different temperatures, at the same time.

Good Gain in Speed

Portable truck racks for handling pieces have almost entirely been eliminated, being replaced by conveyors. This has resulted in economies in production, because of a considerable saving of man power in handling work to and from racks and on trucks. At the same time there is a great deal of floor space saved heretofore taken by racks and trucks. Work, when not in actual process, is kept moving on conveyors from the time it leaves the ground coat dip tanks until the finished pieces go to the inspection tables.

Work is being enameled in much shorter time than with the methods formerly employed. One-coat white pieces are being produced in 2 hr. and three or four-coat work in 5 to 6 hr. Quality of work is improved by close temperature control and the absence of smoke and gases. As work is hung vertically on conveyors, there is not the danger of dust settling on the surfaces as there would be were the pieces piled on racks. And scratching of the enamel, as when handling to and from racks, has been done away with, thus eliminating rejections and returns due to scratched or dirty work.

The company makes as standard products enameled table tops, breakfast room sets and covers for washing machines. In addition it does a jobbing business in the manufacture of miscellaneous enameled parts. The new enameling unit was laid out for production of 2400 sq. ft. of work an hour, or about 30 per cent less than the peak load during the past two years. However, the complete unit has been operated at 30 per cent over load. Some of the old box-type furnaces and other equipment have been retained as reserve, for use if needed during a rush in orders.

With the continuous furnace as the heart or center of the system, the dip tanks, spray booths and other equipment are located to form a compact and well arranged unit. Making a rectangular circuit around the outer side of the equipment comprising the enameling unit is a chain-type continuous overhead conveyor. This is 250 ft. long and 55 ft. across at the ends. This handles work in process from one furnace chamber to

another, work from special booths, excess work from the dipping tanks and spray booths, work to the decorating tables and finished pieces to the inspection tables.

Pieces are suspended on this conveyor or on double hooks on 24-in. centers. As the work remains on the conveyor until it can be taken for the next operation, it often makes more than one circuit of the conveyor. This conveyor has a speed range of from 11 to 30 ft. a minute.

SPEEDING up production by use of straight-line operation on conveyors was only one result obtained by an enameling plant from its new equipment and layout. Saving in fuel costs, sharp reduction in rejections caused by scratched or dirty work and absence of smoke and gases in the working space all help the balance sheet, and the employees have a better place in which to work.

Process Starts in One Corner of Plant

Near one corner of the enameling unit are two dip tanks in which the ground coat is applied. One with its drain board is 25 ft. long, and the other 20 ft. All flat work except table tops goes direct to the burning furnace after dipping, draining and wiping. Table tops and all pieces not flat are dried before going to the furnace. Work that is dipped after the ground coat also goes through this dryer.

In line with the two dip tanks, the dryer is an open-end oven 60 ft. long and 12 ft. wide inside. The work passes through the dryer on an endless chain conveyor that loops back outside each end of the dryer, carrying the pieces through the dryer twice and back to the loading point. Here they are removed and hung on the conveyor of the burning furnace. The conveyor serving the dryer is operated at a speed of about 15 ft. a minute, but has a speed range down to 6 ft. a minute. The work-carrying racks suspended to the conveyor chain have three decks, the top deck taking pieces too large to go on the lower decks. It will handle pieces up to 72 in. long and 33 in. wide. The dryer has a capacity for heating 150 sq. ft. a minute.

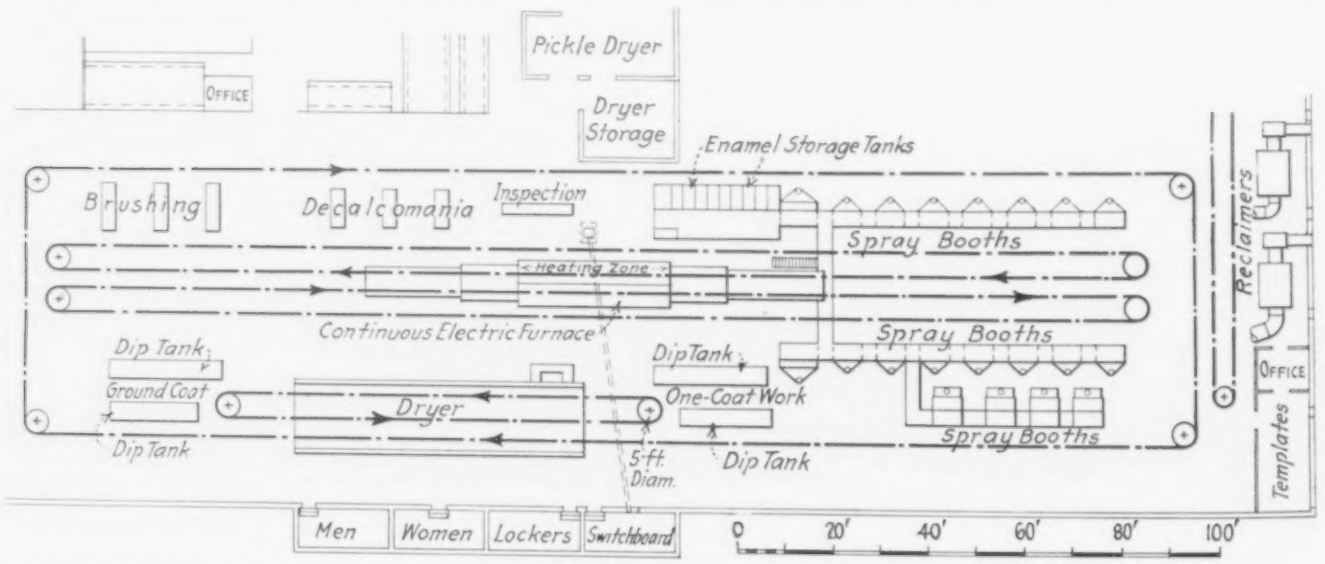
Gas for the dryer is fed through five Bunsen-type Barber burners, each burner having three oblong-tip units, which are located along the center of the dryer just above the floor. Ordinarily a temperature of 150 deg. F. is maintained. This can be reduced by cutting down the gas supply, when a slowing down in output is desired. Circulation is provided by drawing the heated air from the top of the dryer down through a series of ducts on one side and then forcing it across the dryer and through the work. A 7½-hp. fan circulates the air. This dryer, as well as one used for drying the pieces after pickling, has a bleeder damper at the top to take in fresh air from the room.

The company's layout for processing and routing the work called for a double-chamber furnace, and also one with two open ends, so that the enameling operations could be done at both ends and the work could be fed in at both ends. The furnace was built by the General Electric Co., which has recently built several furnaces for burning enamel having one closed end. In these the heating chamber is at the closed end, in which the work loops around, returning to the loading end.

Furnace With Two Heating Chambers and Two Open Ends

The furnace is a 600-kw., 220-volt, three-phase unit. It has a pre-heating chamber 35 ft. long at either end, and two heating chambers (side by side) at the center 25 ft. long, the total over-all length being 95 ft. The pre-heating chambers are on an incline, bringing the elevation of the firing chamber floor at a higher level than either end, thus providing a heat seal for the heating chamber.

There are two separate conveyors, moving in opposite directions, one through each heating chamber.



Layout of the enameling department includes a conveyor encircling the operating units. Other overhead conveyors (all shown by heavy lines) feed burning furnace and dryer. Front end of continuous electric furnace (top of page 1053). This, having two burning chambers, is served by two conveyors moving in opposite directions, each looping back (foreground) outside of the furnace

thus providing an incoming and outgoing conveyor at each end. The openings at the two ends are 54 in. high and 20 in. wide and the two conveyor lines run through on 42½-in. centers. As the wall that divides the heating section into two chambers does not extend into the pre-heating zones, heat from the outgoing work is absorbed in that zone by the cooler incoming work. Side walls of the furnace chamber are 9-in. fire brick and 13½-in. Sil-O-Cel insulation. The roof is 6-in. fire clay tile, and Sil-O-Cel insulating brick, incased in a steel shell.

The double-firing-chamber furnace appears to have certain quite evident advantages. The cost of the furnace is less than two single-chamber furnaces for the same operations, less floor space is required, and it is more economical in operation, as the heat losses are less than they would be in two single-chamber furnaces.

Heating units are nickel-chrome ribbon formed in loops. The furnace has six automatic control panels mounted underneath the heating chamber. Control is through four temperature control and two temperature recording instruments supplied by Leeds & Northrup Co.

Each conveyor extends 65 ft. outside the furnace ends, the over-all length being 225 ft., and loops back along the outside of the furnace, one conveyor on each side, thus adding to the loading space. The conveyor driving mechanism is mounted on a counterweighted automatic take-up and so arranged that an unusual overload on the conveyor will trip a limit switch and stop the motor. The conveyors have speed-reducing and adjusting equipment to provide a speed range of 3 to 18 ft. a minute.

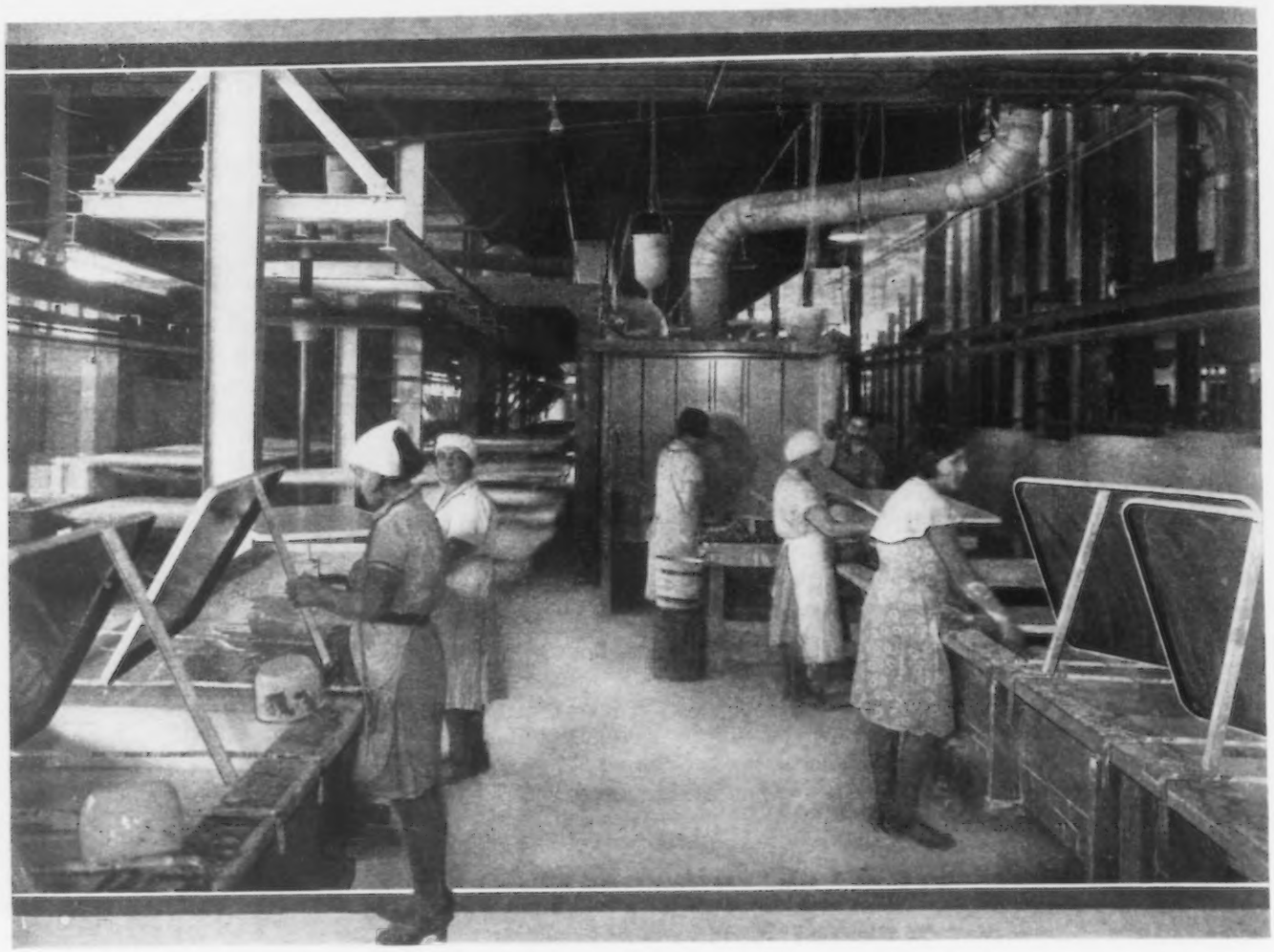
Attached vertically to the conveyor are nickel-chrome suspender rods and each two successive rods carry a cross hanger bar 56 in. long. Work is hung on these cross bars on hooks of various shapes and sizes, with spreaders to keep the pieces apart.

The vertical suspender rods extend through a slot in the roof. To the rods and just above the slot are attached shoes of plate construction, sliding on angles, to seal the slot. The conveyor is sealed on top by an air-tight chamber, to reduce heat losses through convection. Doors are provided at each end of the firing and pre-heating chambers to retain heat when the furnace is not being operated. These are not closed until the temperature drops to approximately 1000 deg., for with the higher temperature the chain must be kept moving.

Two Batteries of Spray Booths for Routine Work

Spray booths are arranged for the convenient routing of work between the booths and the furnace. One furnace chamber is used for burning the ground and first finish coats and the second for the final finish coats and for the decorative coat. Below the lower end of the furnace, alongside the two furnace conveyor loops, are two rows of spray booths, the first line for the first finish coat and the second line for the final coats. After the

LOWER end of the enameling unit, seen from the platform which holds the supply tanks of enamel. At left is one of the walkways and on the railing are buckets from which the enamel is fed to the spray booths below. At the left at the side of the walkway is one of the main ducts to carry the dust to the reclaimers, one of which appears in the background



IN rear at left is the open-end dryer, through which the work loops, returning to near the ground coat spray booths beyond the dryer. In foreground are wheel-mounted dip tanks for dipping work that is given only one coat of enamel after the ground coat

ground coat is burned the work moves on the conveyor in front of the first row of spray booths, the pieces are sprayed, hung back on the same conveyor and go through the furnace for the second baking coat.

Emerging from the furnace a second time they are moved to the adjoining second conveyor loop for the succeeding spraying and burning operations. The ground coat is burned at 1600 to 1650 deg. F., and the finish coats at 1500 to 1550 deg. F. With the furnace conveyors looping back along the outside of the furnace, one on one side and one on the other, work may be hung on these conveyors at any point. After the final spraying and burning the pieces are hung on the finished work conveyor that loops around the unit. If they are to be grained or decorated by the decalcomania process, they are taken off at the point where the decorative transfers are to be applied.

This conveying equipment is extremely flexible in that, from a point at the center of each end of the outside conveyor loop, work may be transferred to one of the two loops of furnace conveyors to take it to the furnace, to any row of spray booths or to any other point in the entire unit.

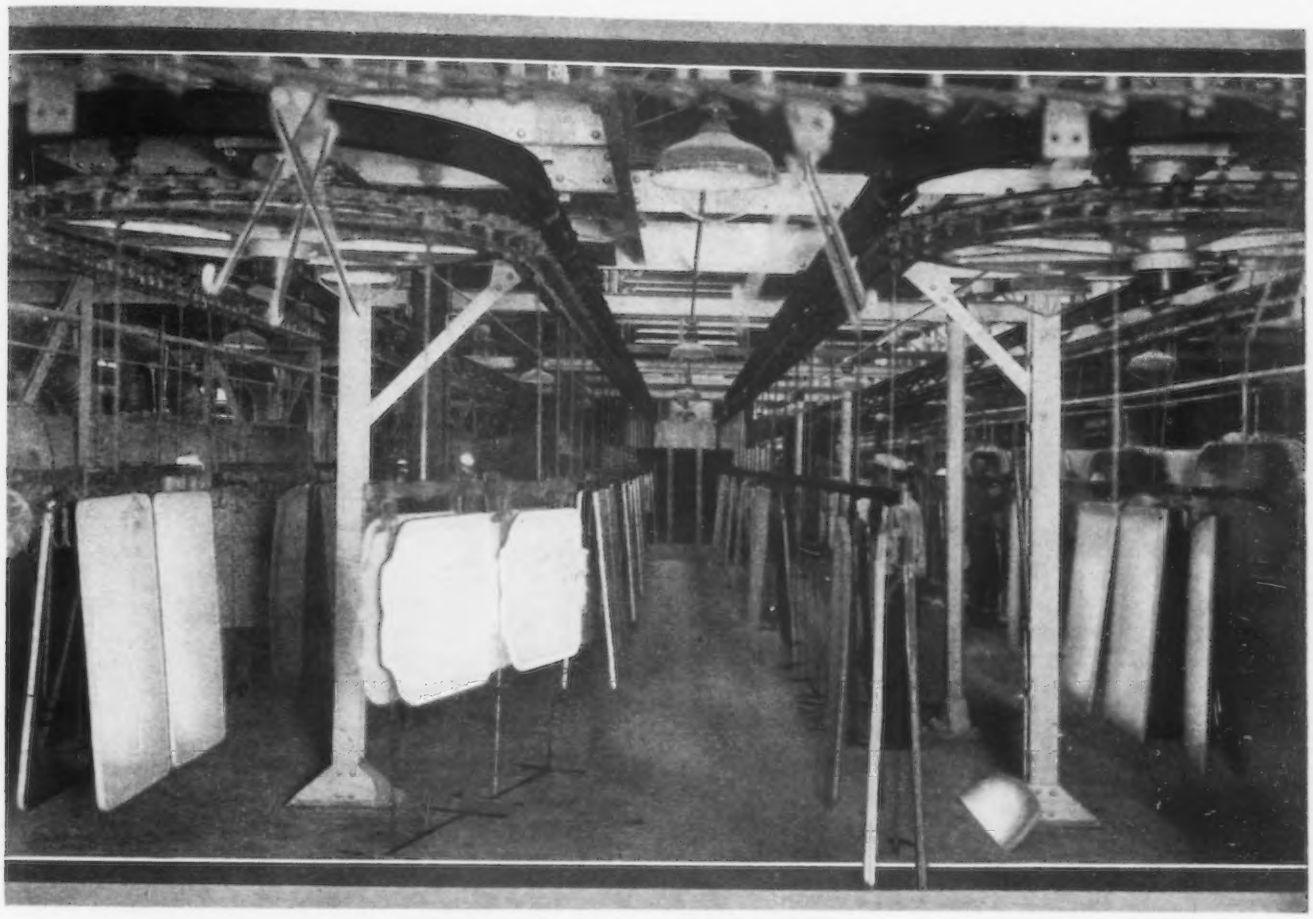
Each line of spray booths consists of seven small booths 6 ft. wide and 42 in. high and one large booth 8 ft. wide and 7 ft. high. In addition, located at the side of the outside conveyor are four booths 6 ft. wide and 7 ft. high for decorative and other special spraying work. These are floor-type booths with work-handling shelves mounted on turntables 2 ft. above the floor.

Two special booths not shown in the drawing are provided for trimming with black and color after the ground coat colors. These, 6 ft. square, are located at either end of the dryer, their fronts being flush with the open ends of the dryer. These pieces are dried after these applications before burning.

When one-coat work in colors or white is being produced, the pieces, instead of being sprayed, are dipped after the ground coat. For this work two dip tanks similar to those used for the ground coat are located at the side of the unit, and at the opposite end of the dryer from the dip tanks previously referred to. These tanks are mounted on casters so that a tank which contains one color may be quickly moved and replaced by another tank containing another color. After dipping in these tanks the work goes through the dryer

Handling the Enamel and Salvaging the Dust

Enamel for the spray booths is placed in oval tanks holding 1400 to 1500 lb., each of which (for convenience in handling and to allow stacking on the floor) is mounted in a cradle of bar and angle construction. The cradles are trucked to the enameling department. Here a hoist places them on an open-grate storage platform near and above the top of the booths, ten of the tanks being kept on the platform to supply the



ENAMELING unit viewed from the other end of the continuous furnace. This shows the two conveyors serving the furnace. Along the outer side of the conveyor lines are two rows of spray booths

enamel for the booths.

Over the booths connected with this platform are walkways. Attached to a hand rail at the side of the walkway is a holder for a bucket, pail shaped at the top and in the form of a cone at the bottom, to which is connected a hose through which the enamel is fed to the spray guns by gravity. Above each booth are three of these containers for three different colors, for often three colors are put on the same piece. The tanks have molasses gates, which feed the enamel into buckets with which attendants keep the containers above the booths filled.

Enamel dust from the spray booths is salvaged through a dust collecting system in two reclaimers or air washers, connected with the booths. By a suction system the dust is drawn from the booth through a 14 or 16-in. exhaust duct at the top. The ducts from each row of booths are connected with a 60-in. header leading to one of the two reclaimers. Connected with each header is a fan with a capacity of 35,000 cu. ft. of air a minute. The air is washed in a spray and the clean air is exhausted outside.

Dampened enamel dust settles into a tank of water, from which it is removed every two weeks, the dust salvaged being about 3½ tons a month. Part of this is remelted and reused. While different colors are combined in this salvaged enamel, green is the predominating color and it can be used for certain classes of work. With the reclaiming system the plant is kept free of dust. Enamel deposited in the booths is scraped off every day and carried in tubs to the remelting room for reuse, being mixed with new enamel. The booths are made with rounded corners, making them easy to clean.

At each end of the enameling department, alongside the rectangular conveyor, is a continuous oil-fired furnace for use when the capacity of the main unit is overtaxed. Outside of the main conveyor loop is another conveyor in the form of a loop, for handling special work, and two dryers, one a table-type dryer for sprayed work and the other for drying dipped parts.

If defects necessitate the removal of the enamel after spraying, it is washed off with a spray of water, two 4 x 9-ft. sinks being provided for this purpose. These are inclosed on three sides, with backs 7 ft. high and tapering down to 4 ft. at the two sides. In the floor are removable gratings covering settling pits.

Templets and Masks for Color Decorations

A method of decorating ware recently developed in the plant is proving efficient and economical, and provides one method of having the decoration stainless, the same as the coating of the piece. Colors are sprayed through a zinc templet and, with the use of masks over part of the decoration, four colors are applied and approximately the same decoration is secured as with the use of decalcomania. The enamel mixture is the same as that used in coating the piece.

In the pickling room are seven tanks in line, served by an air hoist. In addition, there are a number of other tanks not used in production work. The tanks are 9 ft. long, 4 ft. wide and 4 ft. 6 in. deep. There

(*Concluded on page* 1119)

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HOW pipe is handled into and out of storage. Taking finished pipe from storage to outbound car (below) is a single operation. The pipe is handled by lifts, as shown

Pipe in storage is stacked (above) according to size and grade. Handling equipment, operating overhead, is used to spot it at the proper rack

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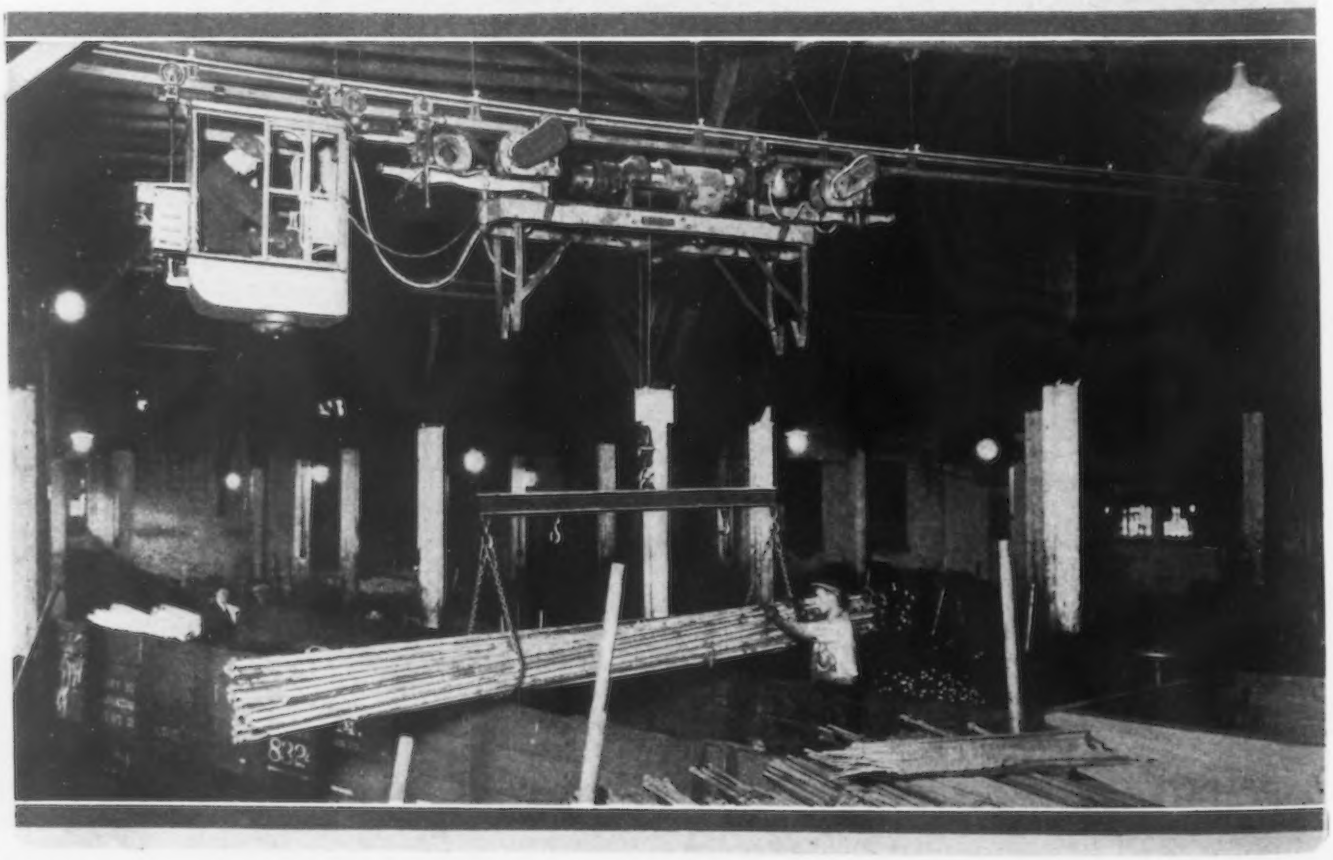

Handling Pipe in Process at an Eastern Rolling Mill

NALYSIS of any materials-handling problem involves the application of two fundamental principles: (1) that material, whether it be raw material, material in process of manufacture, or the finished product, should be handled in as large loads as are practical; (2) that the number of handling operations be reduced to a minimum. It may be impossible to increase the size of the actual unit of manufacture, but it is generally quite possible to handle these units in large numbers at one time without interfering with production, and in this way reduce the average handling time per piece by a considerable amount.

These fundamental principles are applicable to any of the various methods of moving material, and are well exemplified by the overhead method of conveying. How the fundamental considerations are applied to an actual materials-handling problem can well be explained by an examination of the solution of the problem which presented itself at the plant of a rolling mill company handling 80 tons of butt-welded pipe a day.

Pipe had to be taken from the last rolling operation through an inspection process, to and from threading machines, and thence to a large storage shed. After a careful study of the problem it was found that the actual handling operations could be reduced to five in number, and that the best unit load would be 3000 or 4000 lb.

In all, about 400 tons of material had to be handled in a day. The overhead tramrail was decided upon as the most suitable method of conveying, and a system of track and switches was laid out as shown in the diagram. Pipe of varying nominal sizes in 20-ft. lengths is accumulated at the discharge end of the pipe rolling machines, which are located on a lower level, as shown. From there it is carried to racks to cool. As soon as it is sufficiently cool, it is raised to the upper level and set down on inspection tables, where each piece is carefully examined. The pipe rolls down the incline of the inspection tables to other racks, where it can again be conveniently picked up and conveyed to the threading machines.

Since threading is the last process of manufacture, the pipe is carried from the machine shop and placed in various piles, according to size, in the storage shed. As can be seen, the tracks have been so laid out that the entire storage area has been covered, as well as the railroad siding within the building. As orders are to be filled the pipe is taken directly from the storage

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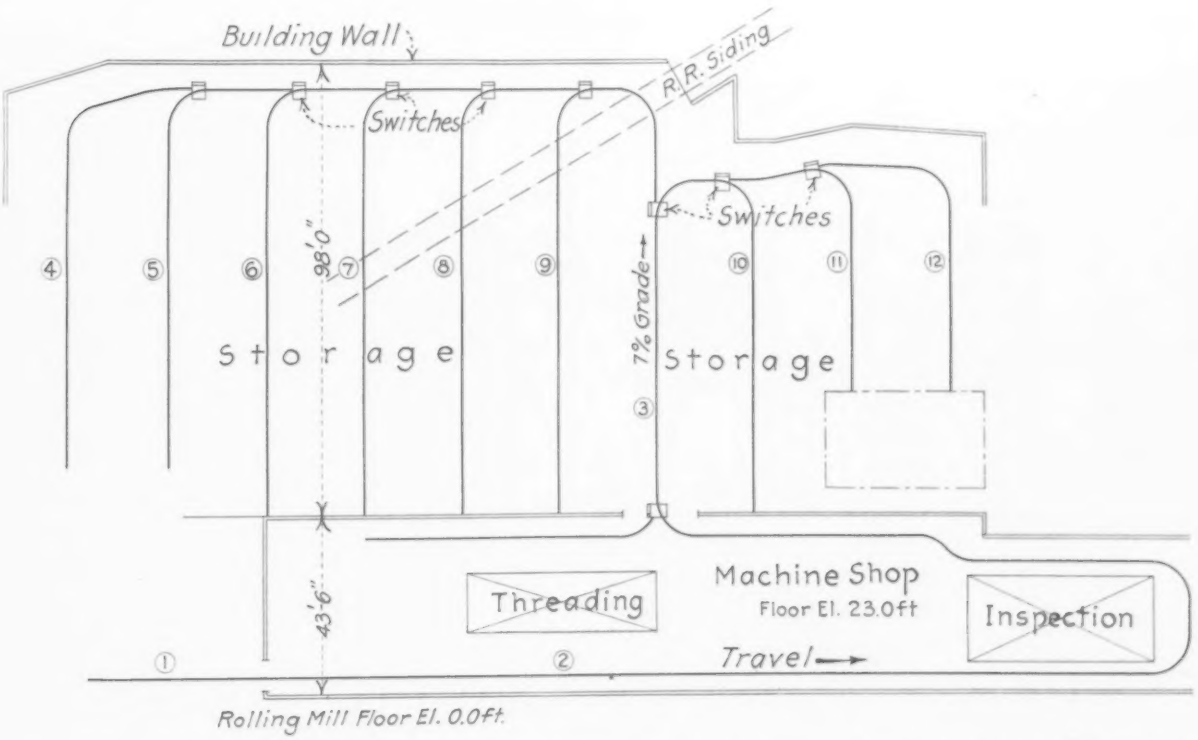
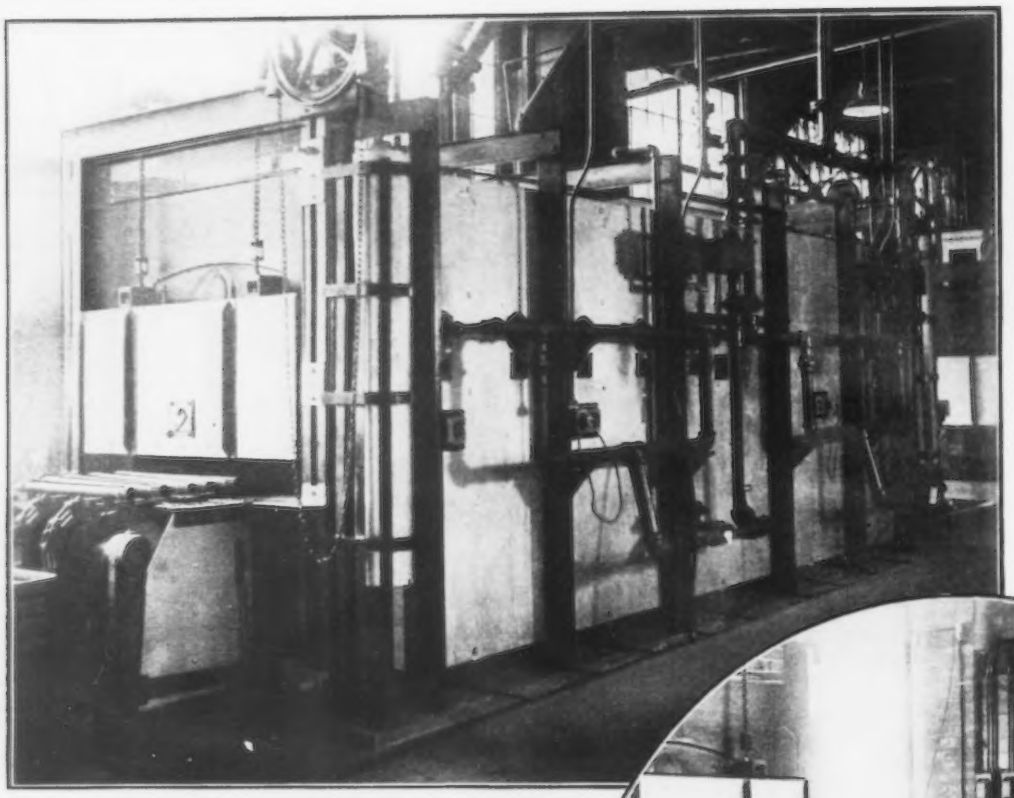


Layout of the machine division, storage warehouse and railroad connections. The pipe climbs 23 ft. from mill to machine shop and is elevated still more when going into storage



THE three gas-fired furnaces for heat treating axles in the plant whose equipment and practice are described in the article opposite appear on this page

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Discharge end of the axle-drawing furnace (above), with the axles coming out just under the door

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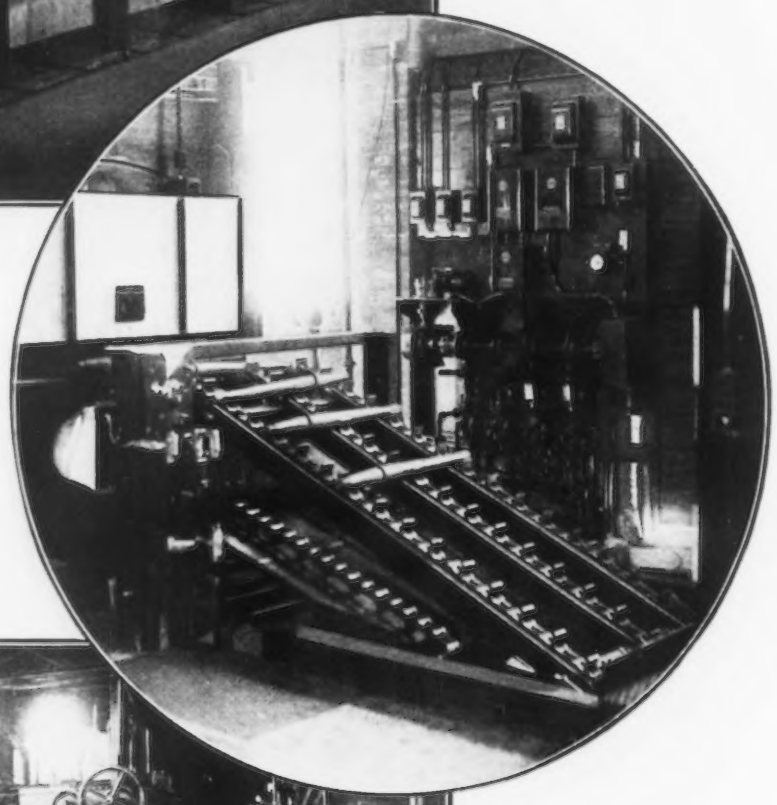

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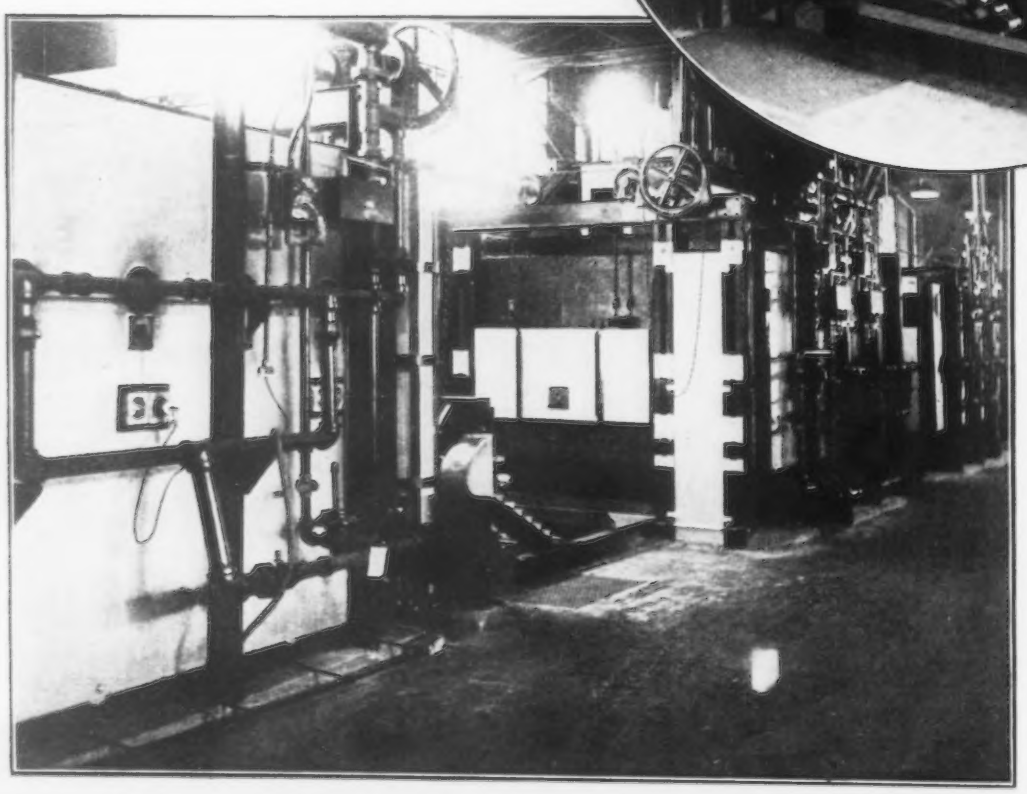
Axle shafts being automatically conveyed (right) from the quenching tank to the drawing furnace



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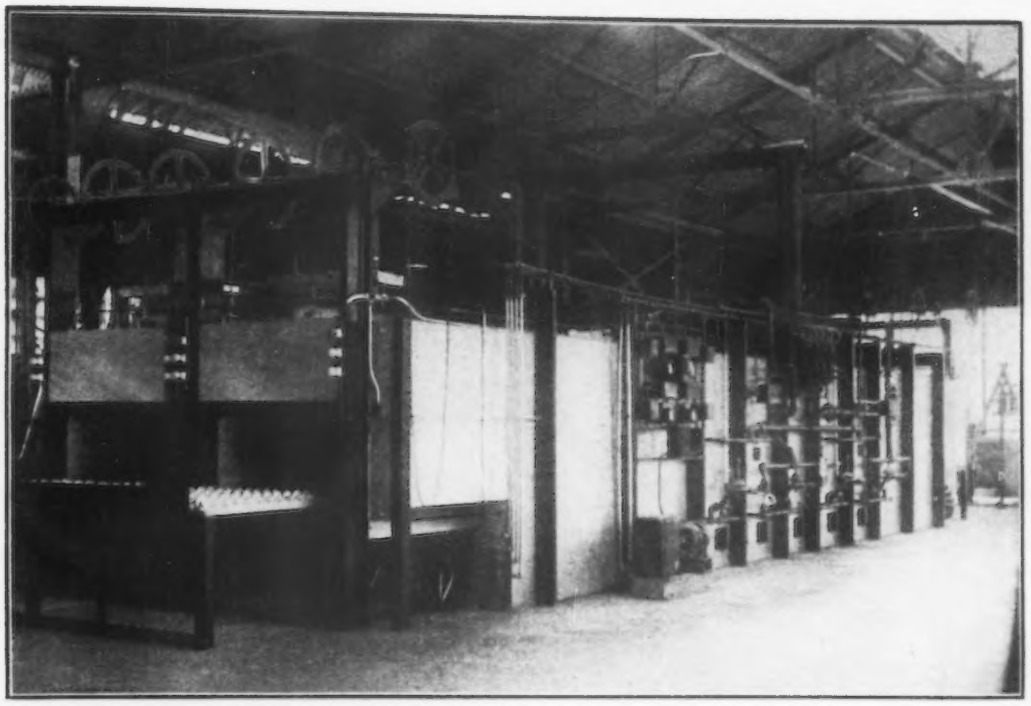
Normalizing furnace (left) is at the extreme right. The hardening furnace and quenching tank in the center and the drawing furnace at the left

Double chamber gas-fired continuous, counterflow, recuperative carburizing furnace (top of opposite page)



Special Furnaces to Heat Treat Axles and Gears

FOR heat treating axle shafts and rear axle gears and pinions for automobiles a new heat-treating department, equipped with interesting types of furnaces with new features of design, has been installed by the Eaton Axle & Spring Co., Cleveland, at its axle division plant.

Three Furnaces in Line

Rear axle shafts are heat treated in continuous and automatic gas-fired equipment, which consists of three furnaces for normalizing, hardening and drawing respectively. The shafts are normalized before hardening to relieve the forging strains. The work follows a continuous line. Starting with the normalizing furnace, it passes through a cooling hood into the hardening furnace, from which it is discharged into a quenching tank and loaded on to another conveyor, which carries it through the drawing furnace. The entire unit is approximately 90 ft. in length.

The furnaces convey the axles through the various heat treatments without the use of shoes or other auxiliary equipment. Chrome-molybdenum steel is for the most part used for axle shafts, although some are chrome-nickel steel.

At the charging end of the normalizing furnace, which is 20 ft. long, the axle shafts are loaded directly on to the conveyor, which extends approximately 3 ft. outside of the furnace. One conveyor serves both the normalizing and hardening furnace and the cooling hood between the two furnaces, and automatically advances the work through these units.

▲ ▲ ▲

AXLE shafts and axle gears and pinions for automobiles are heat treated in new continuous furnaces at the plant of the Eaton Axle & Spring Co., Cleveland.

Rear axle shafts are normalized, hardened and drawn in three gas-fired furnaces in line. Gears are carburized in a two-chamber gas-fired furnace and are hardened in an electric furnace.

A cleaning unit for removing scale and oil is a feature of the plant's new equipment.

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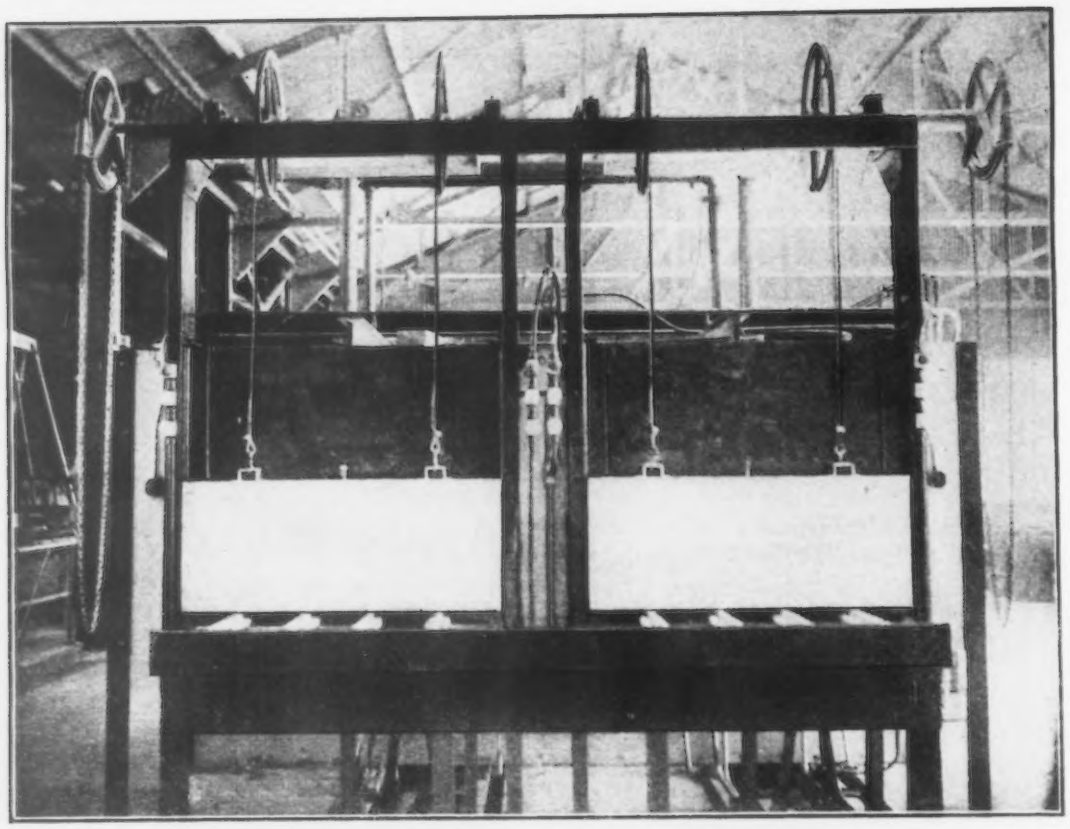


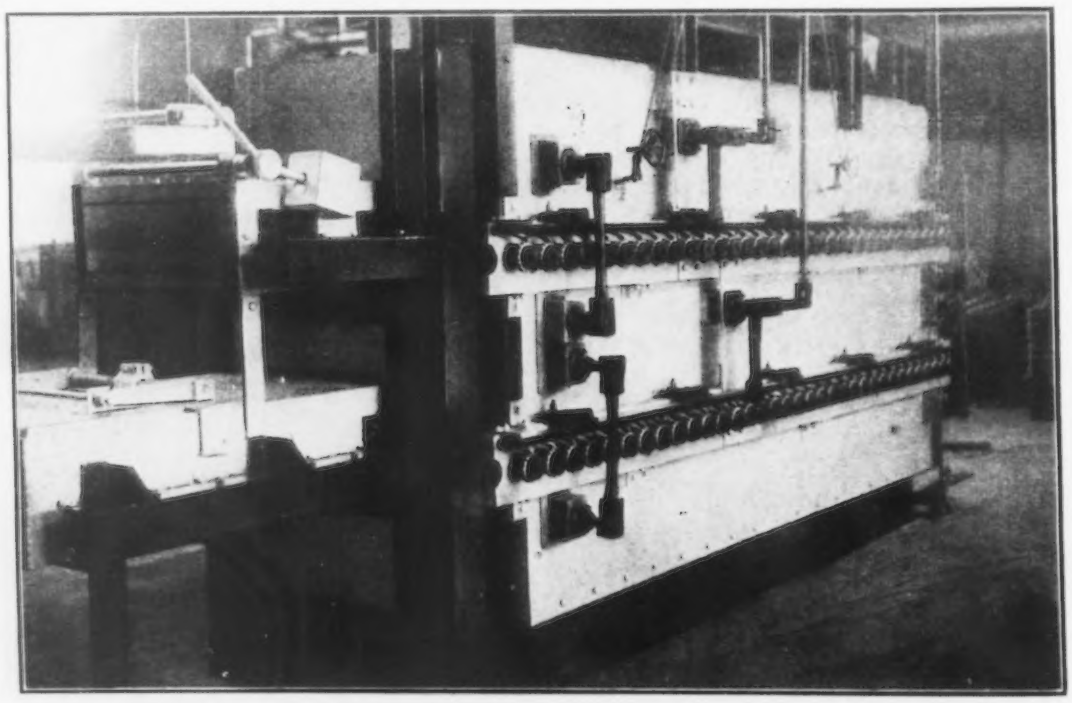
End view of the carburizing furnace

The shafts are normalized at a temperature of 1600 deg. F., remaining in the furnace 2 hr. The cooling hood occupies a 4-ft. space between the furnaces and, while the axles are moving through this, their temperature is reduced to 800 to 1000 deg. F.

The cooling hood is provided with adjustable dampers on the top and bottom, sectionalized longitudinally so that greater or less cooling effect may be obtained at various points in the travel of the work through the hood.

The hardening furnace is 12 ft. in length. The axles are heated in this to 1520 to 1600 deg. F. and remain in the furnace chamber 1 hr. 12 min. At the discharge end of the hardening furnace an automatic mechanism lowers the axles individually into an oil-quenching tank. From the quench they are carried by a conveyor up to the platform of and through the drawing furnace. They are drawn at a temperature of 750 to 1000 deg. F., being kept in the furnace 2 hr. At the discharge end of the drawing furnace the conveyor hearth extends approximately 2½ ft. outside of the furnace and serves as an unloading table.

Provision is made to cover the chute opening at the discharge end of the hardening furnace to permit material to be removed instead of being lowered



Charging end of the double-deck roller hearth, gear-hardening furnace

into the quenching tank so that special heat treatments may be given when this is desired. The conveying mechanism of the three furnaces is so arranged that adjustments may be made for variation of production of from 30 to 120 pieces each hour.

Natural Gas for Two of the Three Furnaces

The normalizing and hardening furnaces are arranged for firing with natural gas by gas burners of the low-pressure type and proportioning mixers for supplying the gas and air mixture to these burners at a constant ratio for any rate of firing. In these furnaces the burners are arranged along one side of the furnace and fire into a combustion space along the full length of the furnace against the bridge wall. Products of combustion pass over the bridge wall, circulate around and through the charge and are drawn off by means of vent flues at both sides of the furnace. These ports communicate with vents extending vertically through the side walls of the furnace and an opening at the top of the walls to the atmosphere.

Burners in the drawing furnace are arranged in staggered position on both sides of the furnace chamber. The application of heat is made by means of an over-fired arrangement to insure uniformity of temperature when firing at the low temperature required. The burners in each furnace are divided into two zones for automatic temperature control. The temperature of each zone is separately and automatically controlled.

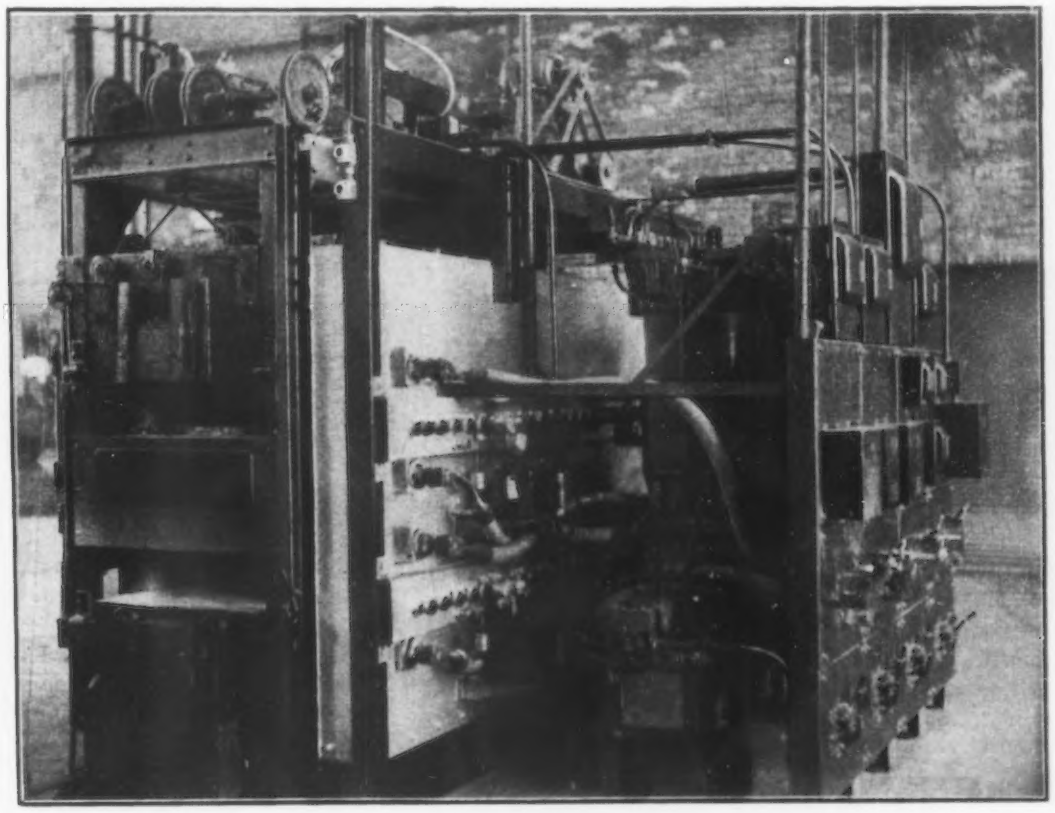
A Two-Chamber Furnace Carburizes Gears

Gears and pinions are carburized in a two-chamber continuous gas-fired furnace, then hardened in a continuous electric furnace, quenched in a conveyor-equipped quenching tank and finally drawn in oil and cleaned in an automatic drawing and cleaning unit in which the work is handled through all the tanks on a single conveyor.

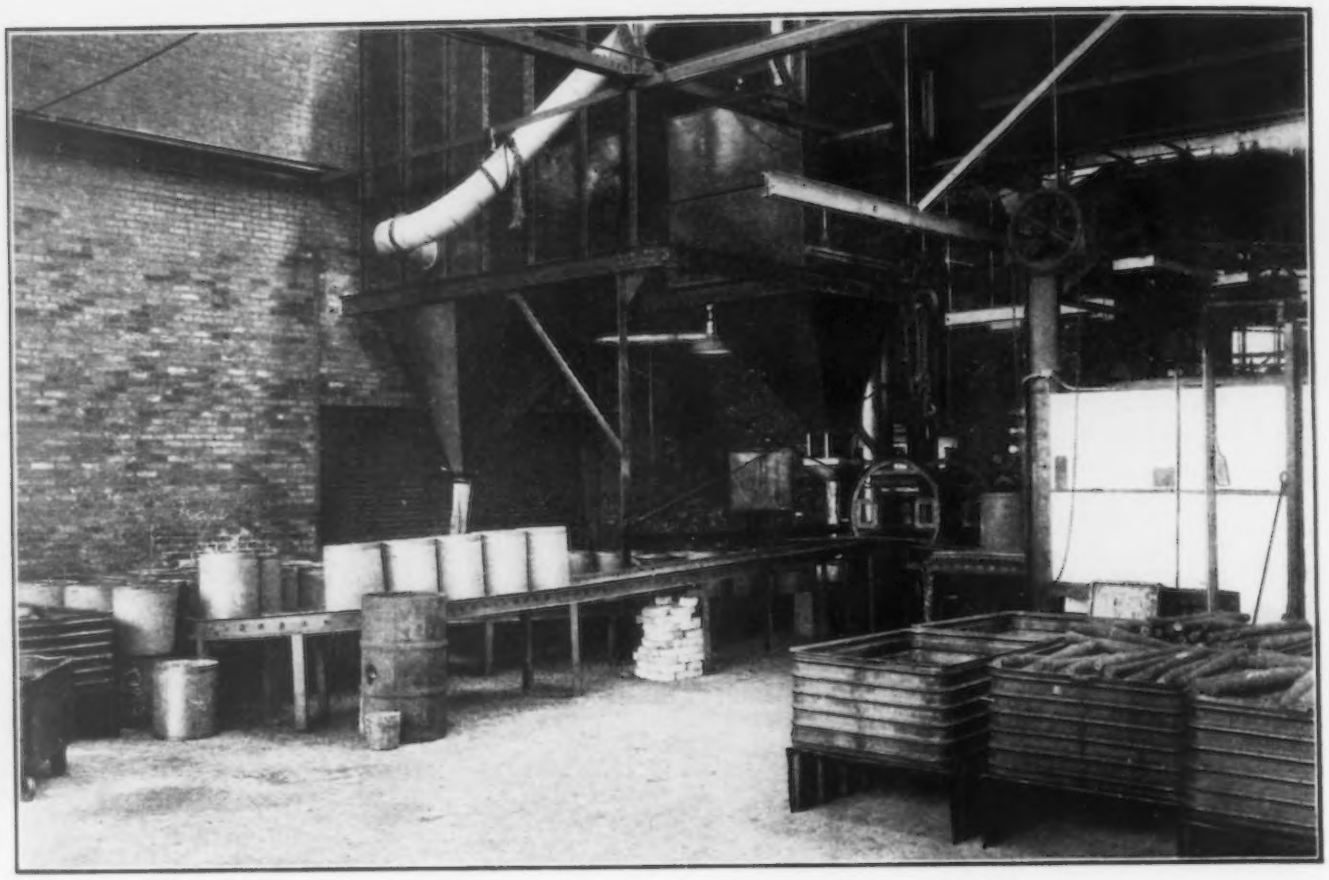
The carburizing furnace is of the counterflow recuperative type. The carburizing boxes are pushed through the furnace lengthwise in two parallel rows in opposite directions, the furnace being loaded and unloaded at both ends. Two carburizing boxes are placed on a tray which moves on alloy roller rails. The heating chamber is approximately 21 ft. long and the recuperative chambers at each end approximately 9 ft. long. The ends of each chamber are inclosed in hoods about 4½ ft. long, making the length of the furnace approximately 48 ft. over all.

The pushing mechanism consists of hydraulically operated pushing heads with 40-in. stroke. These heads are of the disappearing type and are so constructed that the carburizing boxes are pushed into the furnace above the heads. The furnace has an automatically operated electric-hydraulic control pulpit for automatically actuating the furnace at the desired time intervals. It is provided with gas burners of the low-pressure type and proportioning mixers for supplying the gas and air to the burners at a constant ratio for any rate of firing.

Each chamber is independently fired by means of burners along the sides. These burners fire between the supporting piers and below the roller rails into combustion chambers. The products of combustion pass between the tile under the rails and after circulating through and around the charge, pass through the recuperative chamber and are discharged through a vent in the end of each furnace hood. Two additional burners are located at each end of the heating



Discharge end of the gear-hardening furnace. This also shows switchboard transformer and automatic control mechanism



The equipment provided for handling and cleaning the carburizing material and roller conveyor on which the carburizing pots are handled

chamber and fire directly into the chamber to assist in bringing the furnace up to temperature after a shut-down.

The burners are divided into three zones, each separately and automatically controlled. Automatic temperature control valves regulate the supply of air and gas to each zone of each chamber and maintain a uniform and proper temperature.

Alloy Steel for Gears and Pinions

Gears and small differential pinions are made of 3.50 and 5 per cent nickel steel. The 5 per cent nickel steel is used mostly for drive pinions and for small differential pinions where two instead of four of these pinions are used in the assembly. They are carbonized at 1650 deg. F. for 10 hr., and remain in the furnace about 24 hr. The depth of the case is approximately 3/64 in.

The carbonizing pots, round in form, are 16 in. in diameter and 18 in. deep. The pots when filled are raised by a short elevator to a gravity roller conveyor from which they are handled to and from the furnace by an overhead hoist. Roll-over mechanism is provided along the roller conveyor line for turning over the pots after they come from the furnace, after which they remain on the conveyor until the work is cool enough to handle.

Suction System for Cleaning Carburized Parts

An interesting application of a suction-pressure material-conveying and dust-collecting system is provided for handling and cleaning the carburizing material. The pots are dumped over a screen with a ½-in. mesh just above the floor. The carburizing material passes through the screen into a hopper in which new material is added as needed. The material goes through a feeder to a conveying pipe, through which it is elevated to a dust separator above the roof. This removes the fine dust, which passes down a pipe to near the floor, where it is removed. The clean material passes through an automatic dump valve to a hopper-type bin beneath the roof located directly under the dust arrester on the outside. This bin is 6 x 6 x 6 ft., exclusive of the hopper at its bottom. From this storage bin the material passes to a hopper above the loading point and is discharged into the carbonizing boxes through a 3-in. flexible hose. Flow of the material through the hose is controlled by a foot treadle operated valve. The system is operated by a dust collecting type fan driven by a 7½-hp. motor.

Gears Hardened in Electric Furnace

The electric furnace that is used for hardening gears after carbonizing is a double-deck, continuous roller hearth furnace of 120-kw. capacity. The material is conveyed through the furnace chambers by means of nickel-chromium alloy steel rollers that form a continuous conveyor in each chamber. Ring gears and other larger pieces are conveyed directly on the rollers. Smaller parts, such as drive pinions and small gears, are loaded on light alloy trays which are carried through the furnace on the rollers. Motor-operated doors, actuated by foot control switches, are used at the discharge end of both chambers.

Gears and pinions made of 3.50 per cent nickel steel are hardened at 1480 deg. F. and those made of 5 per cent nickel steel are hardened at 1460 deg.

This is another view of the equipment for handling carburizing material and pots. Carburizing furnace shown at the right

Work is kept in the furnace on an average of 45 min., although the furnace is equipped for a variable roller speed providing a time in the furnace ranging from 15 to 75 min. The roller speed in each chamber is separately variable, permitting the chambers to operate at different speeds when operations on work require different heating time.

Heavy cast metallic heating elements are placed above and below the rollers in each chamber and extend the entire length of the chamber. Each chamber is divided into two heating zones. The furnace is provided for variable power input by means of secondary taps on the transformers.

Leaving the electric hardening furnace the work, except ring gears, is quenched in an oil-quenching tank having a vertical intermittently operated conveyor. The work is placed on hooks which are hung on corrugated cross bars. These hold as many as 36 hooks, depending on the size of parts. When this cross bar is filled, the operator pushes a button starting the drive mechanism. After proper travel a limit switch stops the motor and the conveyor comes to rest with the next cross bar in position to be loaded. The quenching tank is approximately 4 ft. wide, 6 ft. long and 2½ ft. high. It is equipped with coils for cooling that are connected with the central cooling system. Ring gears are quenched in three Gleason quenching and straightening machines.

To relieve the strains set up by quenching, the gears after quenching are drawn in oil for 35 min. at 280 deg. F. in an electrically heated tank 202 in. long, 66 in. wide, 30 in. deep and having a capacity of 1700 gal. The heating elements are in the bottom of the tank and the temperature control is automatic.

The automatic drawing and cleaning unit consists of a series of adjoining tanks starting with the drawing tank and all served by an intermittently operated conveyor with arms that raise in and out of the tank the cross bars on which the work is hung on hooks.

Special Process for Removing Oil and Scale

Following drawing, the cleaning operations in their order are: Immersing in light fuel oil to rinse off the heavy oil used in drawing; electrolytically cleaning in two tanks containing an alkaline solution for cleaning off the oil and grease, rinsing in cold water; cleaning in muriatic-sulphuric acid solution for removing the scale, rinsing in cold water; and immersing in a tank containing an alkaline solution for neutralizing. On leaving the last cleaning tank the work is carried back on the endless conveyor over the top of the tanks to the loading point where the pieces are removed. The entire time cycle of drawing and cleaning is approximately 3 hr.

The use of this cleaning unit eliminates the necessity of brushing or sand blasting the work to remove the scale that is formed during the hardening operation.

The electric and gas-fired heat-treating furnaces and mechanically operated quenching tank were built by the Electric Furnace Co., Salem, Ohio. The automatic drawing and cleaning equipment was supplied by the United States Galvanizing & Plating Equipment Corpn., Brooklyn. The Northern Blower Co., Cleveland, supplied the unit for conveying and cleaning the carbonizing material.

Physics as an Aid to Metallurgy

Written for THE IRON AGE *by the*
Republic Research Corporation

METALLURGY has been defined as "the art of extracting metals from their ores at a profit." The hard-bitten professor who flung this definition at his classes 20 years ago was not unaware, in all probability, of the wide possibilities in the application of physics to metallurgy. He was insistent, however, upon recognition of the processes of metallurgy first of all, and upon proper appreciation of the fact that the art of metallurgy, whatever the means employed, must function to produce economic successes.

In recent years the physicist and the physical chemist have made attempts to enter the field of metallurgy—to create from theoretical physics a scientific basis for metallurgical processes. In almost every case where advances have been made (and some of the work has been brilliant) the scientist has forgotten his theoretical foundations sufficiently long to behave empirically. When it is realized that the most brilliant advances of modern physics have taken place in what are essentially simple systems, it is obvious that the applications of theoretical physics to metallurgy are immediately at a disadvantage, for in rare cases only do the problems involve simple systems.

Therefore it is only possible for the physical investigator to take the art of metallurgy as it exists at the present time and perform experiments which are dictated by an imaginative or intuitive appreciation of the problem, using at the same time the tools with which fundamental physics supplies him.

Suggestions have been made, for instance, that it is possible to calculate, from any given set of components or elements, the particular phases which would appear when the components are put together in varying concentrations. The results obtained are elementary and the only way to find out what phases do appear is to mix the components together, heat them up to various temperatures and determine the phases present. Up to the point of determining the phases, the experiment is merely a matter of good "cookery," but, from there on, the investigator uses the microscope, the X-ray, determinations of density, the magnetic, thermal and electrical properties of the phases in order to identify or describe them.

These methods are the gifts of physics to metallurgy. The metallurgist, in order to express his findings, uses the equilibrium diagram which was evolved from the mathematical theory of Willard Gibbs and first applied to chemical systems by Roseboom. If the field of physical metallurgy is considered, the tests, applied to determine the suitability of a material for a special purpose, are almost entirely arbitrary and have but little of a fundamental foundation. It has been found that certain tests may be applied to the material in a relatively simple manner in the laboratory and that these tests, as a matter of experi-

Fig. 1—A simple form of X-ray apparatus. The power equipment consists of a high-tension transformer and a filament lighting transformer

THE thesis of this article is that research in the steel industry, if left too much in the hands of the metallurgist, lacks the broad point of view. On the other hand, physicists and physical chemists are at a great disadvantage in such work because they have no knowledge of the art of producing steel and its products. Best results are achieved by having metallurgist, physicist and physical chemist collaborate.

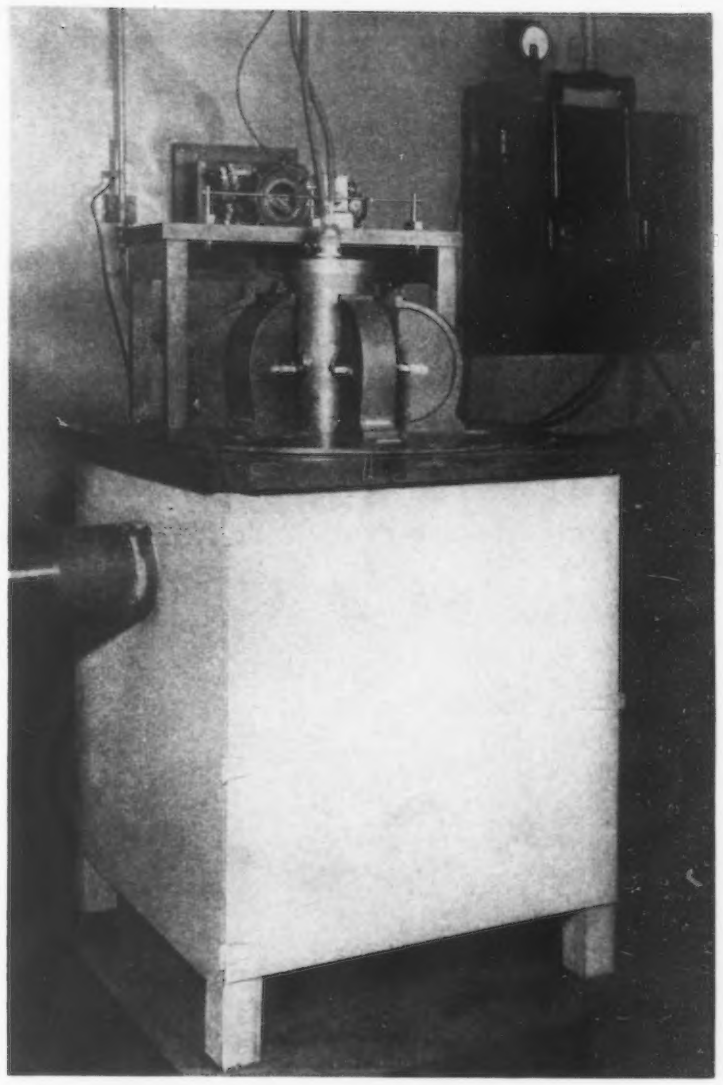


Fig. 2—Another view of X-ray apparatus usually used. The X-ray tube is contained in the lead cylinder mounted on the table

ence, do at any rate determine the safe limits for the use of the material.

But there is, at present, no theoretical method by which we are able to get at the true properties of a piece of steel. We have to pull it, bend it, break it and say, "experience has taught us that if it takes so much effort to break it, it will then be suitable for certain purposes." Using the tools which the physicist gives the metallurgist, the latter is still limited to the same empirical basis, and whatever method is used there is no fundamental information available for the complicated case of a piece of steel. This does not in any way suggest limiting the use of every tool which is available, and the fundamental considerations of physics are extremely valuable in suggesting further experimentation.

Rapid Increase in Metallurgical Research

Research in metallurgy is increasing rapidly. It is necessary to push on, to exhaust completely the possibilities of any one system and then go on to the next. This means an enormous amount of sheer experimentation and the satisfactory and complete interpretation of the work is an almost superhuman task. To catch the significance of any phenomenon is the task of the physicist and then to harness it for use in metallurgy is the work of the metallurgist. This means that any organization whose duty it is to develop processes for production in the manufacturing organization must have a staff of physicists, physical chemists and metallurgists, with the last trained to some extent in the techniques of the first two. The first two supply the methods and the tools, the last uses the tools in his investigations, which are directly in contact with operations.

If the development of research is left too closely to the metallurgist, the work lacks the broad point of view; the physicists alone are helpless, as they have no knowledge of the art. The Republic Research Corpn., in functioning as the research organization for the Republic Steel Corpn., has attempted to bring the two factors together. A suggestion may be made for the development of a new process. The metallurgist will suggest the possible method of working out the details. He will then turn to the physicist or the physical chemist to ask whether there are any fundamental reasons against the possibility of the method working, and to suggest that methods be worked out for the performance of certain operations. He will then, after the results of his own and the other experimental work are available, select those which may possibly function suitably in production, try them out, put the results of all the work together and present them to the operating men.

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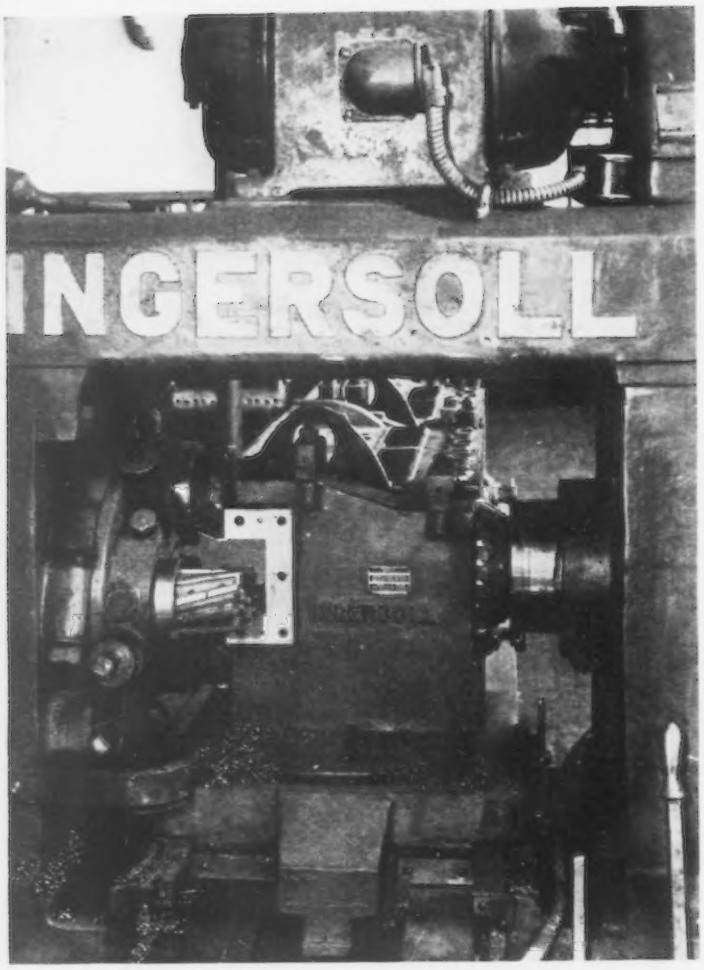
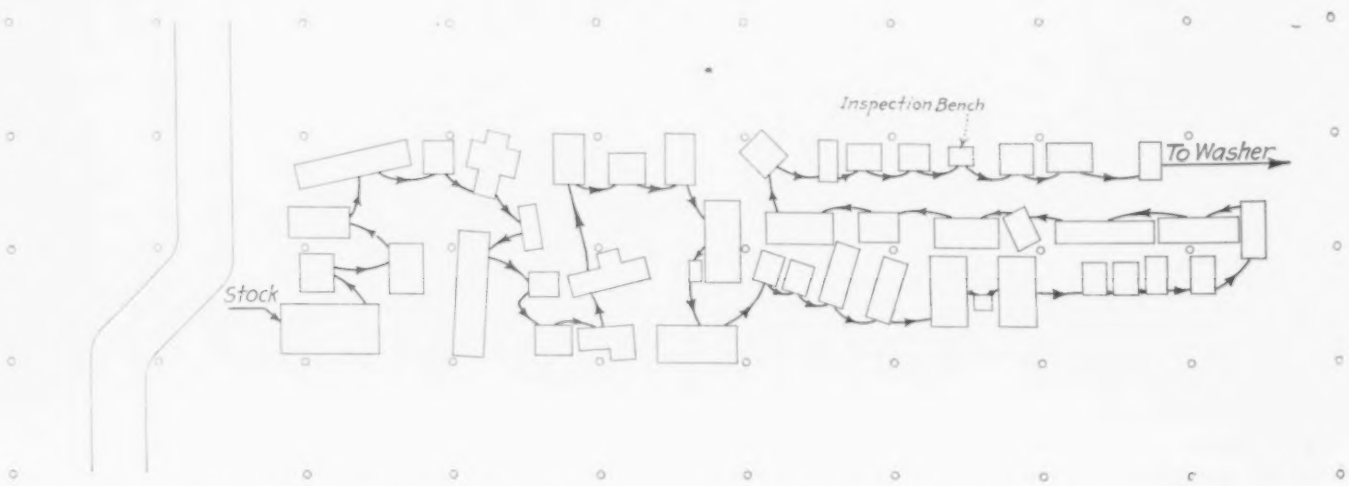


Modern Machine Tools Cut Reo Production Costs

IN tooling up for production of its new Flying Cloud and Reo Royale eight-cylinder models, the Reo Motor Car Co., Lansing, Mich., was faced with the problem of arranging machining operations on the engines so as to fit into available manufacturing space. Work on the cylinder block, for instance, had to be put into an area approximately 55 x 100 ft. at right angles to the engine assembly line. This has been done so successfully that production costs are kept at a low figure. A substantial part of the credit for achieving these economies is due to the use of machine tools of the latest design, the company having expended more than half a million dollars this year in new equipment for the eight-cylinder engine.

With one car in the upper medium-price bracket and the new Reo Royale in what might be termed the quality group, the company has never attempted to turn out its product on the same mass scale as low-priced car makers. Consequently in considering the most feasible method of handling materials in process, it had to keep in mind the impracticability of employing relatively fast-moving mechanical conveyors. It has solved the problem by a combination of various kinds of mechanical equipment operated by hand

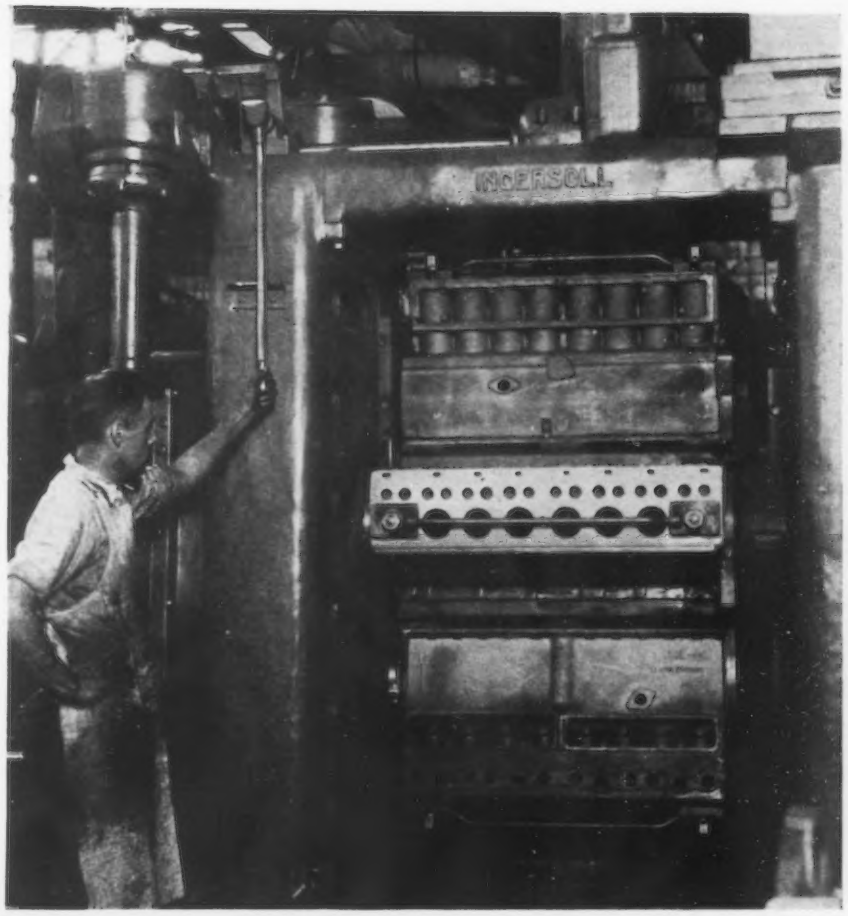


In tooling up for the new eight-cylinder cars, the Reo company was faced with the problem of fitting the engine machining layout to available manufacturing space. Cylinder block work, for instance, had to be confined to space of **55 x 100 ft.**

instead of automatically. In some cases machine operators use chain hoists in transferring cylinder blocks from one machine to another; on other occasions it has been found best to have roller conveyors on which the men push the work from one position to the next. No set rule has been followed. In fact, none could be applied because of the local conditions surrounding each operation.

Cylinder blocks from the receiving dock are delivered to a storage space near the head of the cylinder block line. As they are needed they are taken on a chain hoist to a 14-in. roller conveyor nearby, which runs tangent to benches where the cylinder blocks are cleaned with a liquid solution. They then pass to the spray booth to get a prime coat of paint. In order to dry properly they are stored across the aisle from the spray booth close to the beginning of cylinder block machining operations.

Materials are issued from the company's stock in minimum lots of 75 for unit assembly purposes. The plant can handle eight units an hour.



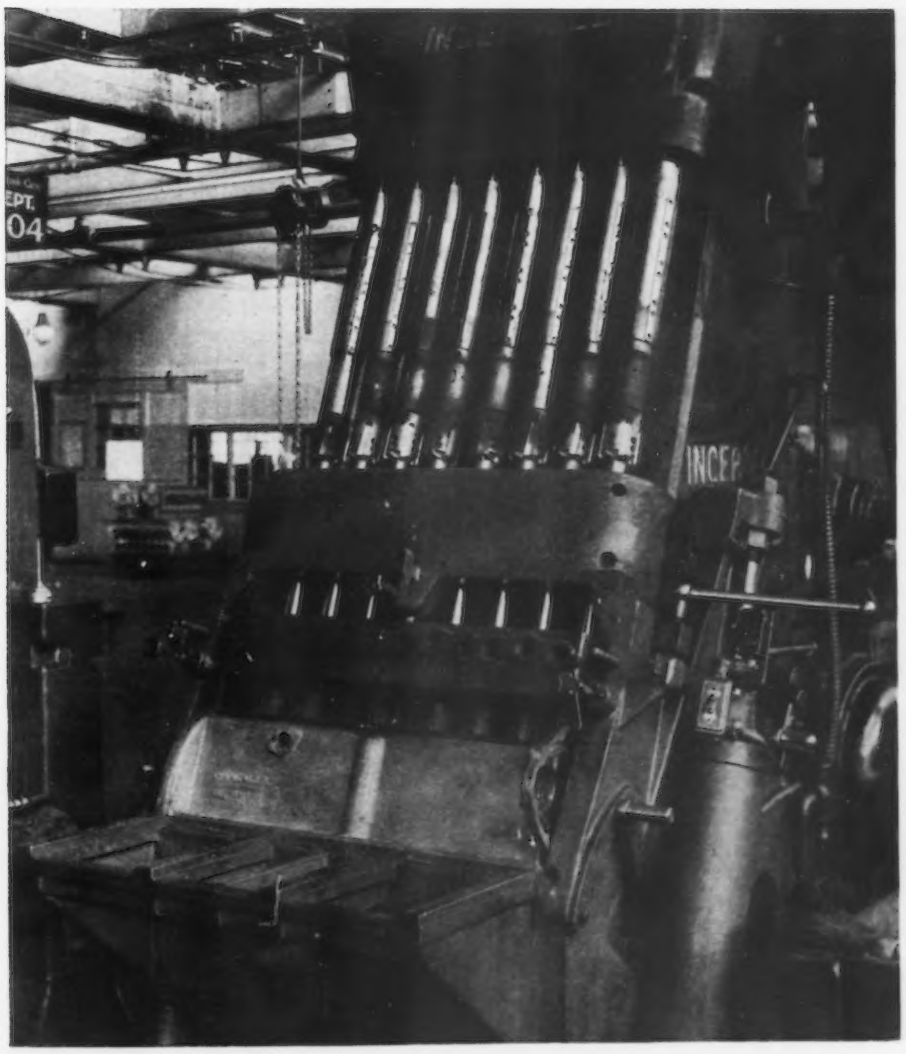


Fig. 1 (on opposite page)—First machining work on crankcase is milling top, bottom and bearing cap seats on special miller

Fig. 2 (above)—Front and rear ends of crankcase and water pump pad are milled on a six-spindle drum-type milling machine

Fig. 3 (at left)—Eight-spindle boring machine used for rough boring of the cylinders

The first machining work on the crankcase is milling the top, bottom and bearing cap seats on an Ingersoll special milling machine, Fig. 1, leaving 0.025 in. on all surfaces for finishing. Two locating holes, each 0.750 in. in diameter, are drilled and reamed in the bottom flange of the crankcase on a special L. & G. two-spindle drilling machine. The front and rear ends of the crankcase and water pump pad then are milled to size on an Ingersoll

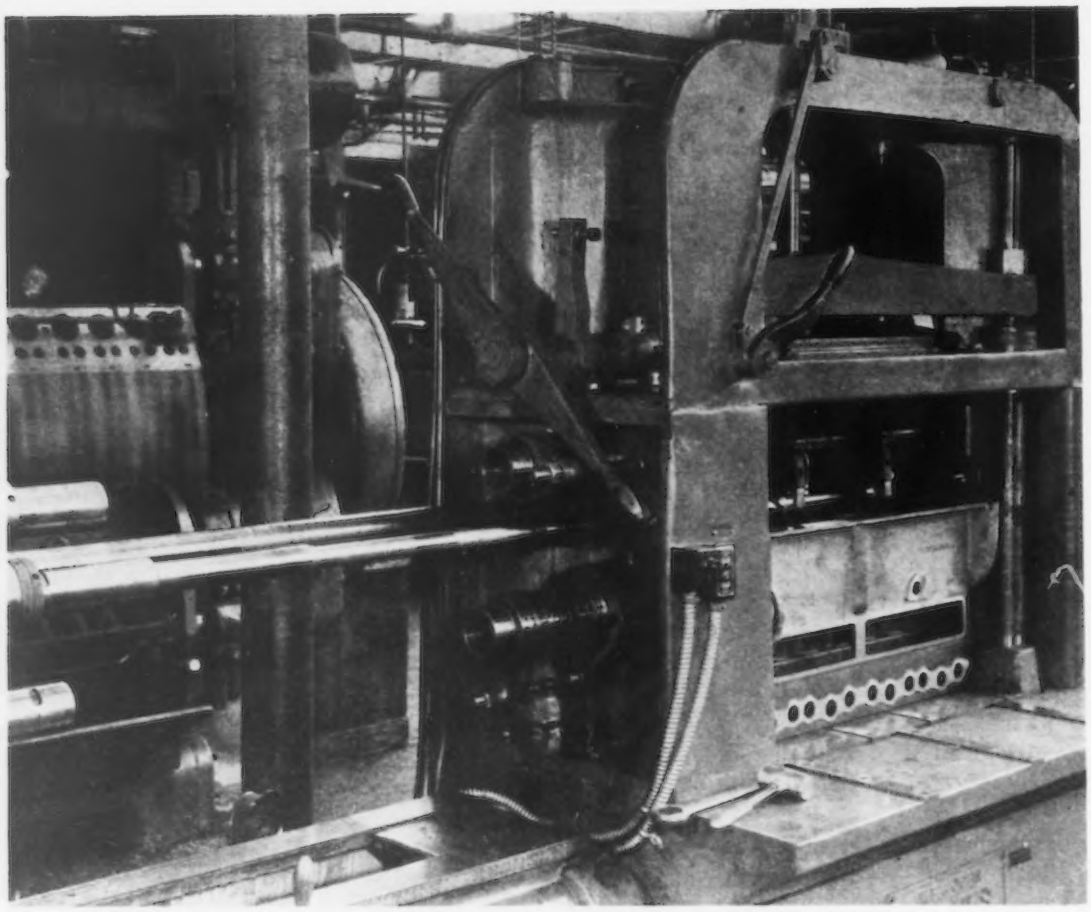


Fig. 5—Rough boring the cylinder block for cam and crank bearings, water pump and starting motor

six-spindle drum-type milling machine shown in Fig. 2.

A rough bore ranging from 3.330 to 3.285 in. in diameter is made for pistons on an Ingersoll eight-spindle cylinder boring machine, Fig. 3, after which an oil supply hole ½ in. in diameter is drilled and a 1⅝ in. oil pressure regulator boss is milled on a W. F. & John Barnes special horizontal duplex drilling machine, Fig. 4. For this job a special fixture and a 3-hp. Millholland milling unit are used.

The oil filter and breather pads are milled on a 48-in. Cincinnati automatic milling machine. This operation is followed by milling the pads on both sides of the cylinder block for the water jacket, tappet cover plates and manifolds. For this purpose a special Ingersoll three-spindle horizontal milling machine has been installed. For rough boring 1⅝-in. holes for the cam bearing and milling the pad for the fuel pump the cylinder block is passed to 2-hp. drilling and

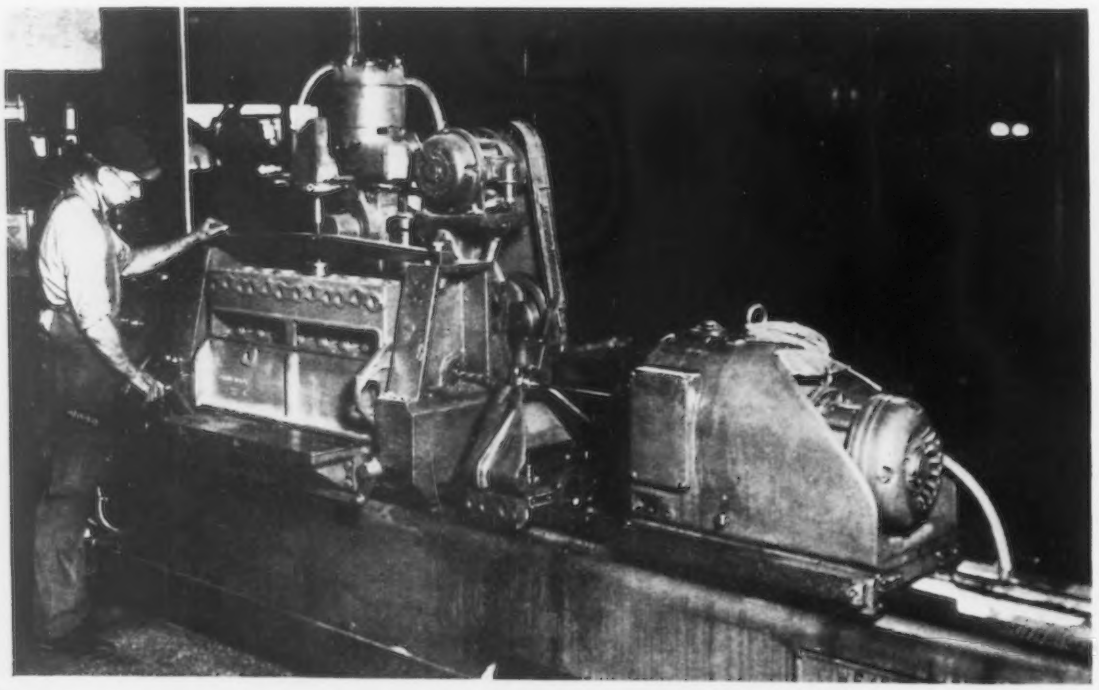


Fig. 4—A ½-in. oil supply hole is drilled and the oil pressure regulator boss is milled on special duplex machines

FACED with the problem of machining eight-cylinder engines in available manufacturing space, the Reo Motor Car Co. has put its cylinder block line into an area 55 x 100 ft. Maximum utilization of floor space, efficient movement of materials in process, by a combination of hand labor and mechanical equipment, and installation of modern, time-saving machine tools have reduced production costs to a low figure.

3-hp. Millholland milling machines.

Rough boring for the cam and crank bearings and for the water pump and starting motor is done on a W. F. & John Barnes special horizontal boring machine, Fig. 5. Six ⅝-in. bosses in the water chamber are faced on a 3-hp. Corwin drilling unit equipped with a six-spindle drilling head. This machine, Fig. 6, likewise drills an 11/32-in. hole from the bottom flange to the oil filter hole. Crank bearings are milled to length on an Ingersoll special milling machine and the bottom flanges are finish milled on a Milwaukee miller, Fig. 7.

Bearing cap seats are finish milled on an Ingersoll special three-spindle open-side milling machine, Fig. 8, and a semi-bore of 3.359 in. to 3.362 in. for piston is made on a Moline boring machine. For chamfering the top of the piston bores, drilling an 11/32-in. hole for the oil pressure regulator and drilling a ½-in. hole for the oil inspection gage, a No. 9 Minster single-spindle drill head and two No. 1 Aveymatic drilling units mounted on a special base are used. The starting motor and generator pads are milled on a special Ingersoll milling machine.

Series of Drilling Operations Follows

A series of drilling operations follows. This includes holes for head studs, valve stem guides, water circulation, drive shaft and oil line connection in the top of the cylinder and holes in the rear end for flywheel housing studs, water jacket drain, starting motor screws, oil seal plate and flywheel housing dowels. A number of other holes also are drilled, including 11 in the front end for the cover and three for the generator bracket, all of this work being performed on a Greenlee three-way drilling machine. Twenty-eight head stud

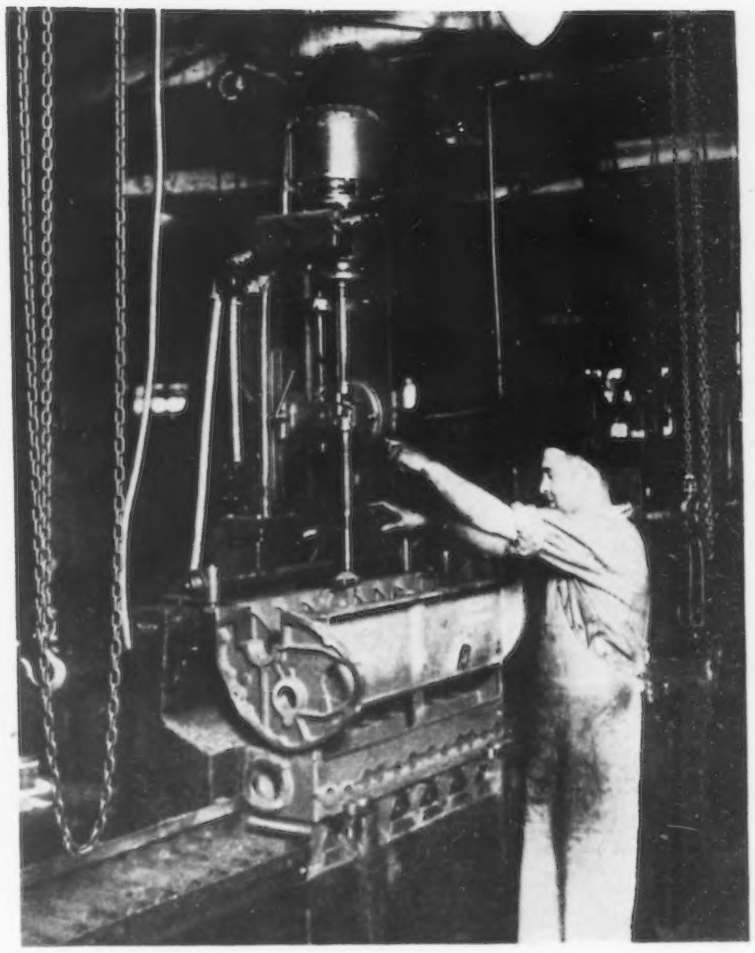
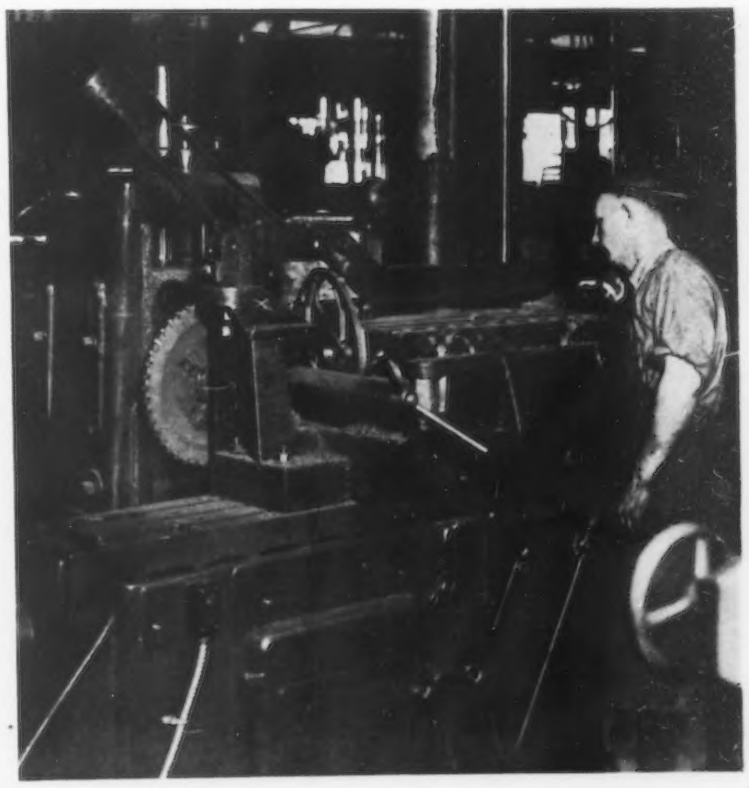


Fig. 6—Six water chamber bosses are faced and an 11/32-in. hole is drilled from bottom flange to oil filter hole on this machine

Fig. 7 (below)—Bottom flanges of cylinder block being finish milled



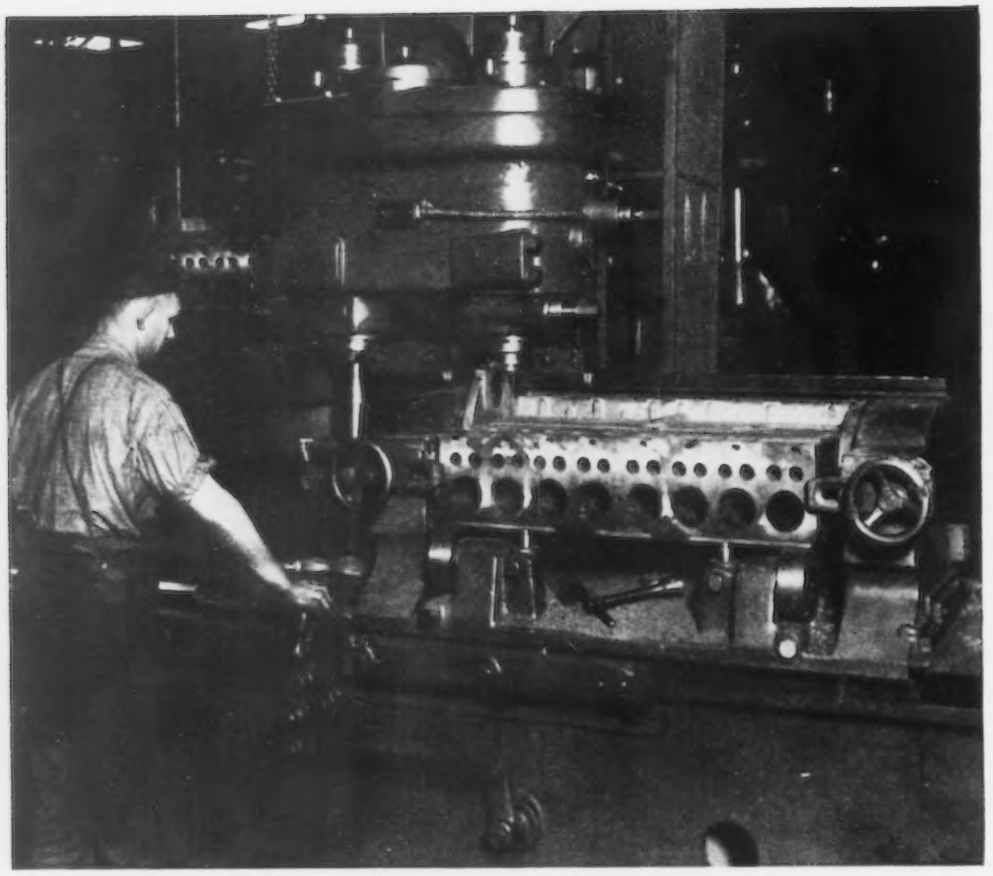


Fig. 8—Bearing cap seats being finish-milled on special three-spindle milling machine

holes then are countersunk by means of a No. 30-860 "Hi-Cycle" drill. This is succeeded by a number of tapping operations on a Greenlee three-way tapping machine.

Valve holes are rough bored and then finish bored on two Moline 16-spindle drilling machines, Fig. 9. The next operation consists of drilling nine 11/32-in. holes from the crank bearings to the main oil line, this work being done with a W. F. & John Barnes special nine-spindle horizontal drilling machine, Fig. 10. Six ¼-in. holes are drilled from the crank to the cam bearings on a W. F. & John Barnes special six-spindle horizontal drilling machine, Fig. 11.

Passing to an Ingersoll three-way drilling machine, the cylinder block has a series of holes drilled for various purposes. Among them are 32 ¼-in. holes for oil pan screws, 22 23/64-in. holes for crank bearing studs, 12 11/32-in. holes for dust shield bolts, 35 13/64-in. holes for cover plate screws and 10 5/16-in. holes for manifold studs.

After having 22 crank bearing stud holes sunk by means of a "Hi-Cycle" drill, the cylinder block moves to an Ingersoll three-way tapping machine, a 3-hp. Corwin drilling unit, a 2-hp. Corwin tapping unit and an Avey drilling machine for further operations. From the latter it passes to a Moline boring machine where the bottom ends of the piston bores are chamfered. Valve stem guide bosses for spring seats are spotfaced on a special spotfacing machine, Fig. 12, having a 16-spindle head. The bearing caps and studs are assembled, the operator using a "Hi-Cycle" drill for this purpose.

Boring of the crank bearings and cam bearings, as well as boring the water pump and starting motor holes to size, follows. This work is done on two W. F. & John Barnes special horizontal boring machines. The rear crank bearing is milled to length and is spotfaced for the inspection gage on a Cincinnati special eccentric head milling machine, Fig. 13, the spotface work being done on an Avey drilling unit mounted on the miller. In connection with the

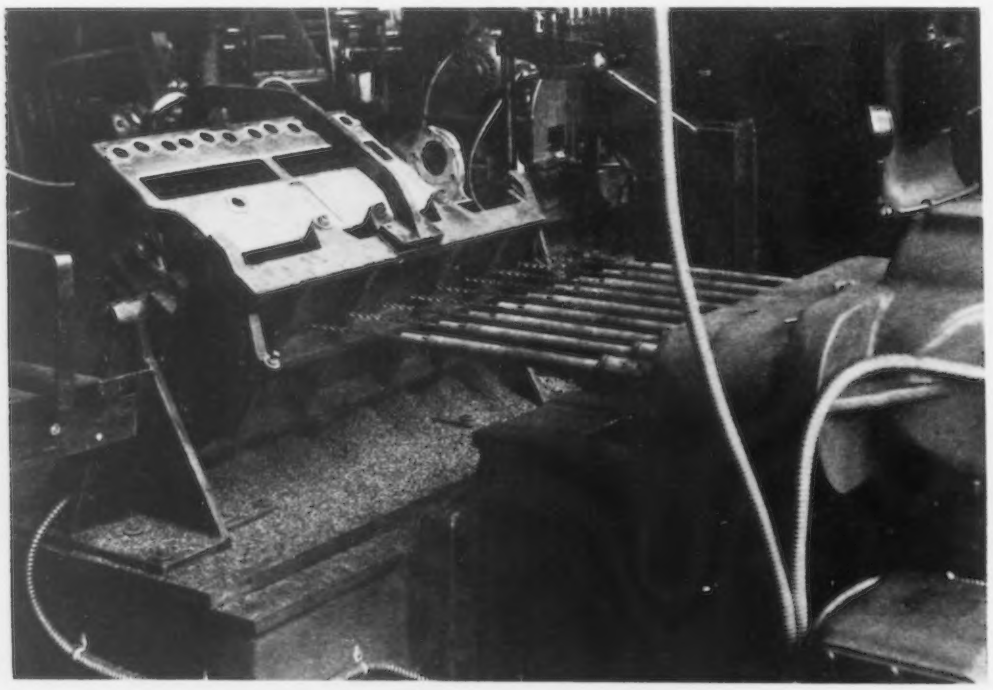
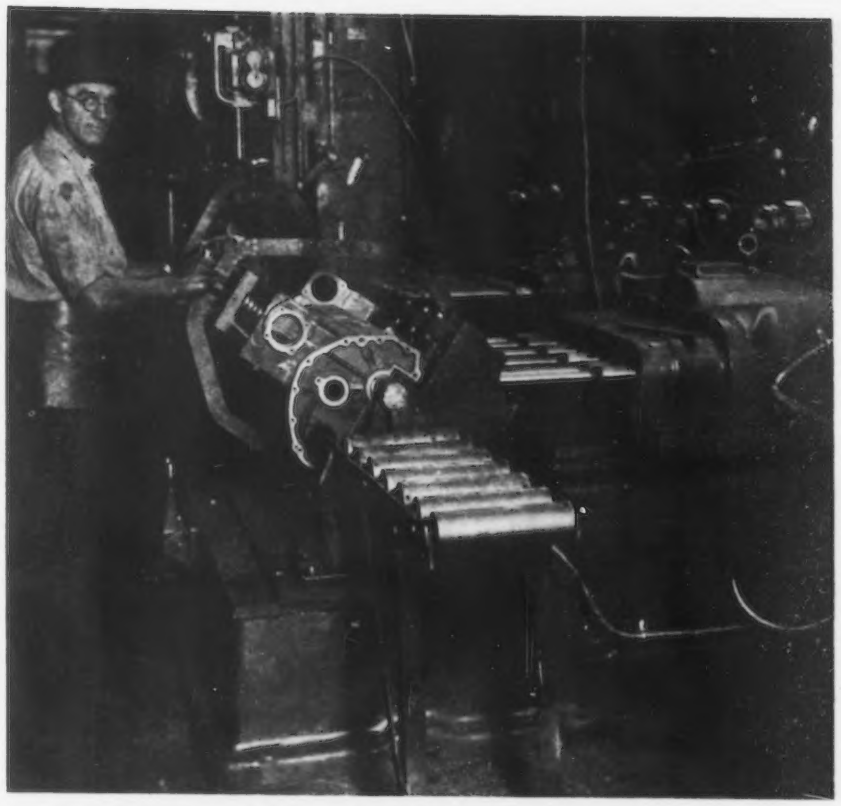


Fig. 10—A special nine-spindle drill is used for drilling 11/32-in. holes from crank bearings to main oil line

Fig. 11—Drilling six ¼-in. holes from crank to cam bearings. Note the device for holding the cylinder block



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milling operation a 45-deg. angular cutter is used.

The rear cam bearing is counterbored and reamed for the fuel pump, a hole for the oil line connection is spotfaced in the front end of the cylinder block and a 3/16-in. hole for the water drain is drilled. Then follows the milling of the bosses for the tappet guides on a special two-spindle Ingersoll miller. Tappet guide studs are drilled, counterbored and tapped on 2-hp. Corwin units equipped with four-spindle heads. The oil pump housing is bored and reamed on a Minster single-spindle drill, and valve stem guides are reamed to size on an L. & G. Gooseneck.

After the piston bores are reamed, cylinder bores and bearings are checked by an inspector, the cylinder block resting on a turntable during the checking work. Following inspection the piston bores are honed on a Barnes honing machine, Fig. 14, and the top face of the cylinder block is finish milled. Valve stem guides are assembled and are pressed into position on a 35-ton Oilgear press, Fig. 15, equipped with a special fixture. At this point the cylinder block is ready for delivery to the motor assembly line.

FIG. 12, showing the spot facing of valve stem guide bosses; Fig. 13, picturing the special eccentric-head miller used to machine the rear crank bearing; Fig. 14, a close-up of the cylinder honing machine; and Fig. 15, showing assembly of valve stem guides on a 35-ton Oilgear press will be included in the next issue of THE IRON AGE, together with additional views of equipment used in this department of the Reo company's plant.

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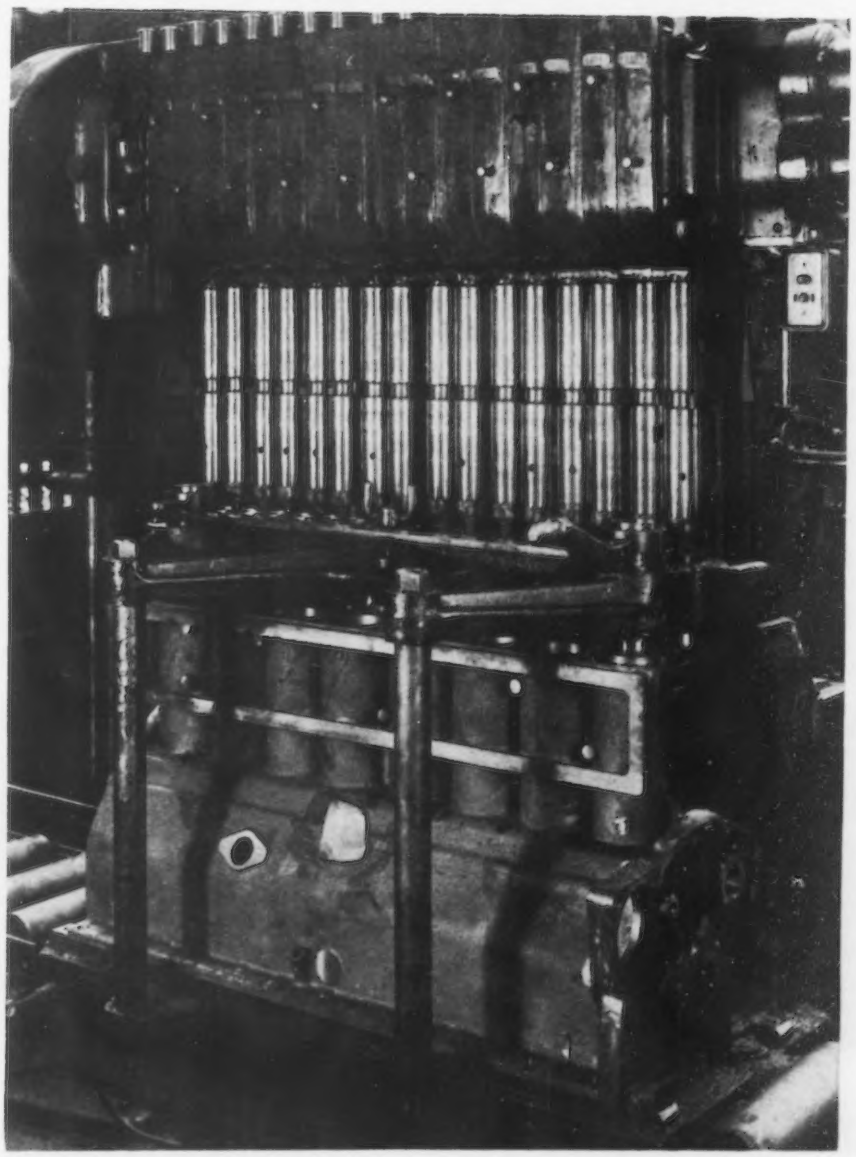
Fig. 9—Valves are rough bored and then finish bored on 16-spindle drilling machines



Truck-Away Plan of Delivering Cars Offers New Steel Outlet

TRAFFIC experts estimate that this year only 38 per cent of finished automobiles are being shipped by railroad from factories to distributers and dealers in the Middle West and the East. In view of the fact that carriers of the country have an enormous investment in approximately 200,000 automobile freight cars, many of which are now idle, the loss of revenue by the diversion of finished cars to other forms of transportation assumes serious proportions.

Although the plan of driving away cars from factories, as well as shipping by water, has accounted for a part of the losses of railroads, the main feature has been the rapidly growing use of the truck-away method. From the carriers' standpoint, the alarming thing is that large automobile makers are being won over to this new method and unless ways and means are discovered, probably in lower rates, to win back some of this traffic, it is likely to be lost to the railroads permanently.

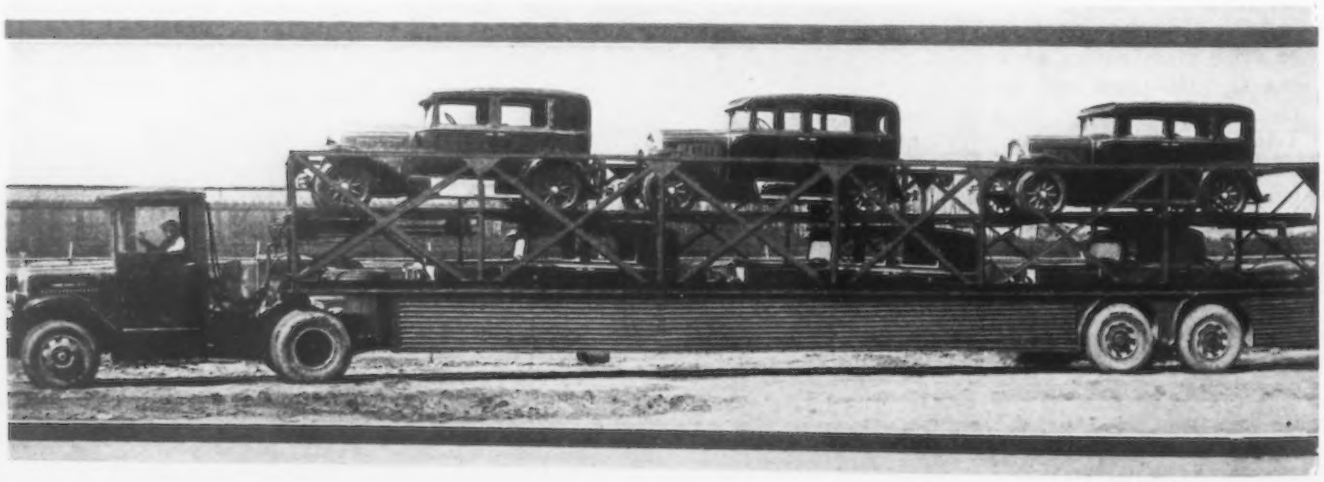
This change in the policy of automobile companies is of significance to the iron and steel industry. If railroads are to get less automobile freight revenue, it means that fewer freight cars will be needed. On the other hand, the building of large trucks and trailers to handle automobiles by the truck-away method is opening up a new market for steel.

For many years truck transportation has played a prominent part in the automobile manufacturing industry. Special trucking companies, such as the Smith Trucking Corporation, have been conducting a business of carrying loads of automobile bodies from body plants in Detroit to assembly lines in Flint and other Michigan cities. Sometimes the trucking companies have been fortunate in arranging for hauls in both directions, although in many cases trucks are loaded only for a one-way haul. These trucks generally have a capacity of 10 or 12 bodies, which are inclosed in wooden frames and protected by a canvas covering. Probably the longest body haul at present is from Grand Rapids, Mich., to Detroit by truck, then to Cleveland by boat, and thence to the Butler, Pa., works of the American Austin Car Co.

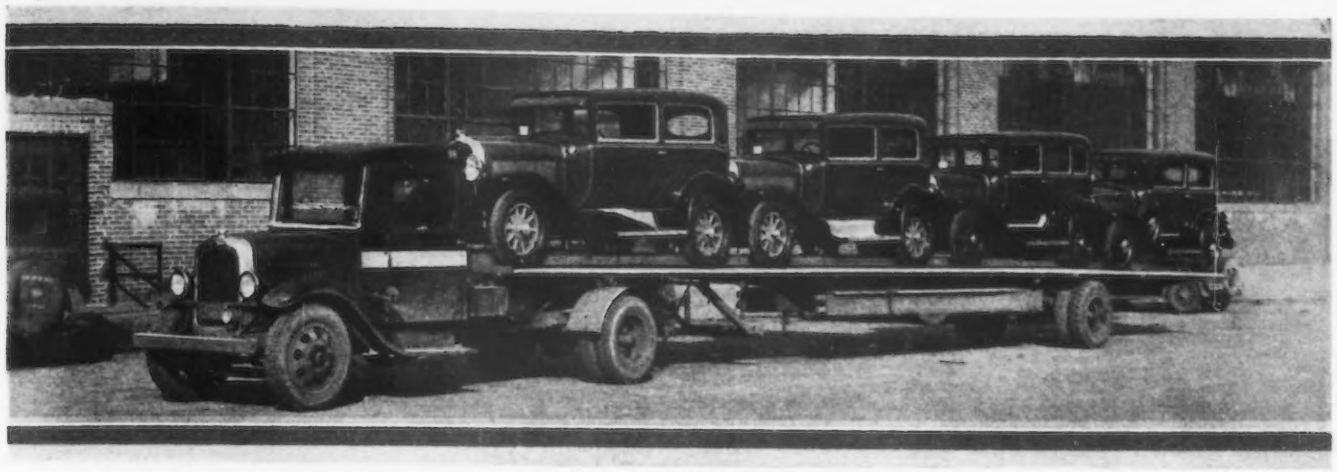
"Truck-away" to Supplant "Drive-away"

The success of automobile companies in trucking parts no doubt suggested the feasibility of the same method for getting finished cars from factories to various sales agencies throughout the country. Preceding the adoption of the truck-away, however, was the drive-away system by which distributers or dealers contracted with companies or individuals to drive finished cars to destination. One large manufacturer has determined from cost studies that the "drive-away" for moderate distances is cheaper than rail movement, even though the former requires a man for every car.

However, a chief objection to the "drive-away" is the fact that a car shows the mileage separating the factory from the dealer and,



BUICKS, Pontiacs and Oaklands are carried from Flint and Pontiac, Mich., to Chicago in double-deck trailers powered by truck-tractors. Studebakers and Nashes from South Bend, Ind., and Kenosha, Wis., are brought to Detroit on return trip. Each load is equivalent to two freight cars



THIS simple type of carrier has long been in use for truck-away deliveries from factories to distributers and dealers

consequently, many customers feel that they are not getting a new car. Wear on tires, even on a short trip, is visible. These are some of the reasons why the truck-away method is considered preferable.

Few people realize how extensive truck-away deliveries have become. Regular schedules are being maintained from Detroit to Kansas City, about 700 miles. Automobiles are transported by boat from Detroit to Duluth and then are trucked into Minnesota and the Dakotas. The same combination of boat and truck is used in shipping cars from Michigan to New York and New England. They are taken on Lake freighters to Buffalo and then put on trucks for shipment to Eastern points. Buicks, Pontiacs and Oaklands are carried from Flint and Pontiac, Mich., to Chicago in double-deck trailers powered by truck-tractors, the capacity of which is six machines. This is equivalent to two automobile freight cars. On the return trip the trucking company brings Studebakers and Nashes from South Bend, Ind., and Kenosha, Wis., to Detroit.

One Company to Use Trucks Exclusively

Since trucking has proved in many cases to be cheaper than a "drive-away," it is expected that hauls by this method will become longer. Automobile people predict that finished cars will soon be trucked into distant territories where heretofore drive-away and railroad deliveries have been used exclusively.

The truck-away has got its biggest impetus from the decision of a low-priced car maker to take up this practice as soon as possible in hauling all of its finished automobiles from its numerous assembly plants to dealers scattered in all parts of the United States. Combination units of truck-tractors and long steel trailers will carry hundreds of thousands of cars annually to dealers. When this plan gets into full swing, the only income which railroads will derive from this company is on raw materials and unassembled parts destined for branch plants.

From experience this company has found that in using railroads the most economical shipping practice is to load only four finished automobiles in a freight car. Furthermore, there is considerable expense in preparing cars so that they will be well protected during shipment. In addition, there is an average loading charge of $2 a machine, which can be saved.

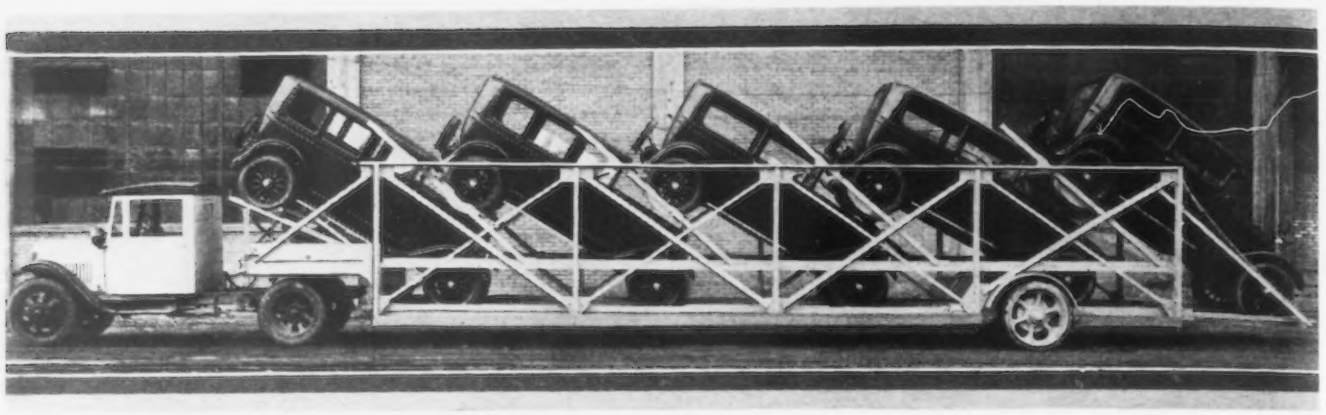
One of the largest applications of the new method of conveying cars is to be in the company's Illinois assembly plant, which turns out more than 100,000 units annually. It supplies dealers in a radius of about 300 miles, penetrating northern Illinois and Indiana, southwestern Michigan and eastern Iowa. A year ago practically all of the output at this plant was being sent to dealers by rail.

By using the truck-away plan, one driver will deliver four complete machines to dealers in one trip. Forty truck-away units are in service at this branch assembly plant and 60 more are to be put into operation. This equipment will be duplicated in other branch plants as well as at the main assembly factory. The units consist of a truck-tractor and trailer, the latter being comprised of two longitudinal steel ramps supported at the rear by wheels and at the front by the tractor. A narrow rod extends the length of the trailer between the ramps. Small metal rods attached to it are hooked over front and rear axles of cars after they are rolled onto the trailer so as to hold them firmly in position. The entire unit has an overall length of about 65 ft.

IN seeking ways and means of reducing further the price which the public must pay for automobiles, factories are turning to the truck-away method of delivering cars to distributers and dealers at low cost. A large maker of low-priced cars soon will be transporting all of its output on all-steel trailers powered by truck - tractors. Manufacture of these trailers gives a new outlet for steel.

New Method Will Cut Delivery Costs

Laws in Illinois and adjoining States permit the operation of long tractor-trailer units. However, some States impose restrictions and, consequently the length of the units must vary to conform to highway traffic regulations. In some instances double trailers



FOR truck-away shipment automobiles sometimes are placed at 45 deg. angle on trailers. These trailers are made of steel

will be substituted for the long single unit. A structural steel fabricator in Detroit has been engaged for some time in the manufacture of these trailers. The truck-away system also offers a new outlet for truck-tractors. In the case of the large automobile company already referred to, it will build its own truck-tractors for this purpose.

The truck-away scheme offers many advantages. Its flexibility in making quick and easy changes in delivery routes commends it. It is a time-saver as compared with railroad transportation. However, its major accomplishment is its small cost. It is estimated that passenger cars can be put into the hands of dealers at probably half of the railroad freight charge. At a time when automobile companies are making every effort to achieve economies in order to pass along to the public reductions in the retail prices, it is little wonder that they are turning to this comparatively new means of transportation. Apparently what the railroads stand to lose in the rapid development of the truck-away method the public eventually will gain.

Machinery Exports Continue Their Downward Movement

WASHINGTON, Sept. 27.—Declining $3,712,000, exports of machinery in August were valued at $34,294,398, against $38,007,000 in July. In the first eight months of the current year machinery exports were valued at $386,180,939, a drop of $26,463,214, or 6.4 per cent, from those in the like period of last year.

Total exports were the smallest for any August since 1926, and for any month since September, 1928. With that exception, they were below all months since October, 1927. The decline has been continuous since March, when the large total of $56,089,000 was exported.

Exports of industrial machinery, as classified by the Division of Statistics, Department of Commerce, were valued at $15,613,558, against $17,986,482 in July. Exports of power-driven metal-working machine tools in August represented 501 units, valued at $1,008,031, against 850, valued at $1,450,538, in July.

Imports of machinery in August were valued at $1,326,528. In the first eight months of 1930 they were valued at $17,832,186, compared with $21,716,902 in the same period last year. Imports of industrial, office and printing machinery in August were valued at $1,012,015.

Machinery Exports from the United States
(By Value in Thousands of Dollars)

	August		Eight Months Ended August	
	1930	1929	1930	1929
Locomotives	$46	$814	$584	$2,561
Other steam engines	88	55	457	543
Boilers	119	144	905	1,312
Accessories and parts	66	90	664	650
Automobile engines	142	540	5,164	8,835
Other internal combustion engines	490	751	6,334	6,702
Accessories and parts	256	312	2,509	3,103
Electric locomotives	22	3	491	466
Other electric machinery and apparatus	765	1,002	7,176	8,879
Excavating machinery	363	736	7,333	5,797
Concrete mixers	45	125	673	1,002
Road-making machinery	150	304	2,723	2,149
Elevators and elevator machinery	256	437	3,754	3,506
Mining and quarrying machinery	1,055	1,599	10,384	11,650
Oil-well machinery	1,553	1,874	18,267	17,104
Pumps	670	718	6,564	7,961
Bending and power presses	278	113	3,101	2,337
Machine tools*	1,788	2,088	18,031	18,995
Forging machinery	127	114	1,472	1,028
Other metal-working machinery and parts	491	566	4,640	5,103
Textile machinery	691	700	6,119	8,880
Sewing machines	446	786	5,118	6,967
Shoe machinery	137	172	1,183	1,356
Flour-mill and gristmill machinery	10	38	241	381
Sugar-mill machinery	769	754	3,002	2,428
Paper and pulp-mill machinery	400	645	2,343	2,547
Sawmill machinery	30	70	548	604
Other woodworking machinery	154	181	1,235	1,593
Refrigerating and ice-making machinery	229	1,902	2,803	3,704
Air compressors	338	651	4,368	5,224
Typewriters	968	1,639	12,047	16,244
Power laundry machinery	51	184	1,041	1,443
Typesetting machines	283	391	2,671	3,960
Printing presses	576	391	3,679	4,794
Agricultural machinery and implements	5,872	13,672	92,261	100,472
All other machinery and parts	14,570	17,436	146,296	142,374
Total	$34,294	$51,997	$386,181	$412,644

*Principal details in another table.

A new silicon-zinc-copper alloy was described by Dr. E. Vaders before the autumn meeting of the (British) Institute of Metals, Sept. 9 to 12 at Southampton. The best alloys of this class are those with 80 to 82 per cent of copper; these can be forged hot, rolled and extruded and give good castings in chill sand or pressure molds. The cast alloys have a dense, uniform structure, free from shrinkage cavities even in the thickest parts. In the cast state the tensile strength exceeds 70,000 lb. per sq. in. with an elongation of 10-15 per cent; after forging or drawing these figures rise to 90,000 to 120,000 lb. per sq. in. 30-10 per cent respectively. The alloys are suitable for the manufacture of bearings and bells.

Drop Forgers Hold Fall Meeting

Need for Diversification of Business Stressed—Grain-Size Specifications and Rustless Steel Are Subjects of Papers

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GROUP action in industry was emphasized as an imperative need at the fall meeting of the American Drop Forging Institute, held at Briar Cliff Lodge, Westchester County, N. Y., Oct. 9, 10 and 11. That voluntary group action is becoming a dominant force is evidenced by the fact that the first trade conference was held in 1919 and that since that time some 13,000 trade associations have come into existence, declared President C. H. Smith, Steel Improvement & Forge Co., Cleveland, in opening the program. These associations, he stated, "have come to stay."

He reported that a uniform cost system is now in use among a large percentage of the plants of members of the forging institute and that a committee to formulate standard practice for a handbook had made excellent progress. This handbook, as later explained by the committee chairman, L. W. Greve, Champion Machine & Forging Co., Cleveland, will be widely distributed among college undergraduates and plant engineers to familiarize those who specify, or are likely to specify materials, with the uses and virtues of drop forgings. An expanded market can be obtained only by such a campaign of education. Too many plant engineers know little or nothing about drop forgings.

Urges Appointment of Research Engineer

The need for diversification was also stressed by President Smith. "It is often said," he asserted, "that the forging industry primarily serves the automobile and truck industry. There is no question but what the automotive manufacturer has been one of our principal customers, because his requirements usually run into large volume over comparatively few companies. Each year, however, we hear of new developments in the use of drop forgings and undoubtedly there are many unexplored fields open for development. The diversification of our products will have a far-reaching effect for greater stability in production as well as employment.

"Greater progress would be attained in this work if we had a research engineer who could give all his time to it. His duties would be many in studying new fields and new applications for drop forgings, to help solve the many problems that are constantly arising in the operation of our drop forging plants, where the reduction in costs is of vital importance and with it a corresponding improvement in our quality."

Opposes Wage Cuts

In commenting on the impossibility of forecasting depressions and the futility of predicting business recovery, President Smith called attention to the opportunities for constructive work during present slack times.

"It is in periods of depression that new ideas in production, engineering and marketing have their origin and the turn of every cycle in the past has brought new heights of achievement in the progress of drop forging. . . .

"It is in this period that the drop forging industry must have the greatest courage. Like all other industries, we have some companies that have always enjoyed volume production and have been attempting to meet these abnormal conditions by cutting prices beyond manufacturing costs and then attempting to meet the condition with a corresponding reduction in wages. This, I believe, is a very bad condition for any business and I hope it will not be the general rule to reduce wages in our industry."

Danger of Selling Below Cost

The current depression differs from the preceding prosperity in respect to surplus capacity only in degree, according to C. R. Stevenson, Stevenson, Harrison & Jordan, industrial consultants, New York, who was one of the speakers. Even at the peak of output last year most industries had idle producing capacity. This surplus is a threat to profits because it tempts the selfish to attempt to get more than their fair share of business by quoting prices not justified by costs. The company that sells at below "normal" cost is taking the first step toward financial ruin, he declared. It is true that Ford and others succeeded in tapping new strata of demand by selling below cost and thereby consistently lowered their costs, but such a program can be followed in only a few industries catering directly to the ultimate consumer. Even Ford, in Mr. Stevenson's opinion, has reached the stage where that plan can no longer be followed.

Normal cost is not to be confused with historical costs and is not a fixed standard but must be adjusted to changes in conditions of manufacture. But adherence to such a standard and a stamping out of individual selfishness in industries is essential to business stability and healthy growth. No danger of a dulling of initiative exists, because competition of industry against industry insures constant effort to improve methods and reduce costs.

Foremanship Training Not a Fad

What grain size specifications mean to the forging industry was the subject of a paper by H. W. McQuaid, Timken-Detroit Axle Co., Detroit, while Earl Smith, Republic Steel Corpn., Massillon, Ohio, outlined problems arising out of forging rustless steel.

A. R. Peirce, director of industrial education, National Metal Trades Association, Chicago, spoke on "Experiences with Foremanship Training."

"Foremanship training in the metal trade industries is not a fad," he declared. "Worthwhile results are continually being recorded and an actual count indicates a healthy growth in the number of successful programs in operation.

"Successful experiences with foremanship training have not been limited to the larger organizations. It has been just as easy to produce desirable results in the smaller plants. Foremen from plants not having enough men to form a minimum-size conference group have been successfully trained in composite conference groups made up of the foremen from several small organizations in the same community.

"Foremanship conference leaders as a group seek more information and experience both for personal benefit and to aid them in their conference work, and to this end in several cities they have formed clubs."

How to Get Most Out of Fuel Oil

"Fuel Oil and Furnaces" was the subject of an address by R. C. Hopkins, Volcanic Specialties Co., Alliance, Ohio. He discussed furnace design and emphasized the necessity of having the right size of burner. When a burner is forced, it gets insufficient air and there is a CO loss that hits one's pocketbook.

His remarks were focused particularly on the change in the character

of fuel oil that has taken place in recent years. The refining of crude oil at high temperatures has resulted in a heavier grade of fuel oil reaching the market. However, the present grade is cheaper and contains more B.t.u. per gal. than the old lightweight oil.

In using the heavier oil it is essential to keep it in motion in a circulating line and to preheat it with exhaust steam. It is unnecessary to heat the main storage higher than a pumping temperature of 75, 80 or 100 deg., but an auxiliary storage should be provided for heating the oil to burning temperature. Some plants preheat to 160 deg., but most heavy oils burn readily if preheated to 140 deg. Fahr. The purpose of the heating is to bring down the viscosity; it does not overcome difficulties arising from sludge precipitation.

A mill, in which heavy oil is treated mechanically to reduce the size of sludge particles and to make the oil structure homogeneous, was described by the speaker. This treatment prevents the clogging up of burners, he said, and makes possible the use of oils not previously suitable for burning.

The mill consists of saw teeth around a shaft. Rotating at high speed, it sets up a centrifugal separation, throwing the heavier particles to the outside of the chamber. A great deal of sludge is thrown into solution by milling and all particles are reduced in size, Mr. Hopkins asserted. Viscosity, however, is not materially changed by the process.

Rustless Steel Hard to Forge

In discussing rustless steel as it concerns the forger, Mr. Smith declared that chrome alloys are difficult to work mechanically, taking two to three times the power of ordinary carbon steel. Chromium alloys are also easily coarsened by heat, become brittle when cold unless properly treated or alloyed, and are poor conductors of heat.

Since the original ingot structure of a chrome alloy is nearly always coarsely crystalline, the entire surface is usually removed from the billet before rolling to a bar. The most satisfactory surface for forging is turned bar stock.

Essentials in working rustless steel are: Clean steel inside and upon the surface; heating cycles that provide for preheat below the grain growth range in simple chrome steel and below the carbide precipitation in the chrome-nickel steels; rapid controlled heating from the preheat temperature to working temperature and positive fast work while hot, keeping in mind that the cold-working ranges begin much higher than in simple steels while the top temperatures for working are no higher; scrupulous inspection for surface defects to insure that any trapped scale is removed.

Chrome-nickel steel forgings must not be heated above 2350 deg. Fahr. because then non-hardenable Delta iron appears.

President Smith, in discussing Mr. Earl Smith's paper, agreed that 2300 to 2350 deg. was a dangerous temperature range. In his plant it was found necessary to put pyrometer control on furnaces heating rustless steel. Where ordinary forging steel takes 20 blows, rustless will take 40 blows of a hammer and probably a reheat, he added. Die maintenance for rustless steel forgings costs about three times as much as for carbon steel.

IT is in periods of depression that new ideas in production, engineering and marketing have their origin and the turn of every cycle in the past has brought new heights of achievement in the progress of drop forging.

Like all other industries, we have some companies that have always enjoyed volume production and have been attempting to meet these abnormal conditions by cutting prices beyond manufacturing costs and then attempting to meet the condition with a corresponding reduction in wages. This is a very bad condition for any business and I hope it will not be the general rule to reduce wages in our industry. — President Smith, American Drop Forging Institute.

Rust Arising from Scale

In commenting on the necessity for extreme care in cleaning and polishing rustless steel, Mr. Earl Smith stated that coupons from all of the sheets used for mullions on the Empire State Building, New York, were subjected to 100-hr. salt spray tests and one of them was rejected because of a speck of scale that had not been removed in the polishing. The scale from chrome or chrome-nickel steel is virtually the same as from ordinary steel and will decompose in moist air. The rust stain will spoil the appearance of the rustless steel, although it will not shorten its life.

The mullions on the Empire State Building, New York, were made of rustless steel, he added, not merely to enhance the appearance of the structure, but also to decrease its deadweight. The experiment may lead to the eventual elimination of all masonry work on the exterior of skyscrapers, he declared.

Reasons underlying the comparatively recent addition of grain size to the metallurgical specifications in purchase orders for steel used for forgings were given by Mr. McQuaid in an address on "Grain Size and What It Means to the Drop Forger."

Grain size, it was pointed out, is being increasingly specified, particularly in the case of gear steels, axle steels and steels of carburizing grade. Although such specifications do not affect materially the forging process, they do have an important bearing on forge plant operation, since overlooking them might result in the rejection of a large number of forgings by the user.

Reference was made to the investigation which led to the McQuaid-Ehn carburizing test. This investigation developed that the manner in which a heat of steel was finished in the melting furnace and in the ladle affected the size of grain. "If the steel was well made and deoxidized with manganese and silicon, the grain was coarse, whereas if much aluminum or vanadium was used, the grain became fine, the size depending upon the amount of these deoxidizers used," said Mr. McQuaid. "Coarse grain is indicative of clean and well made steel, but the fine-grained steel is not necessarily a steel which is poorly finished; in fact, the reverse is quite often the case, since to make a heat in which the grain is as desired, it is necessary that the steel be made exceptionally clean to start with. The reason for this is that the amount of vanadium or aluminum, etc., used to control the grain size must be determined by the grain size of the steel before the addition of these controlling elements; hence it is necessary to start with a steel which has been exceptionally well finished with manganese and silicon."

"It was determined that the coarser the grain size the better the steel responded to the quenching operation and the greater its tendency to coarsen with heating. The coarser the grain the narrower the quenching range and the less ductile the quenched part."

In determining the grain size by the McQuaid-Ehn test, a sample of the steel is taken either from the bloom, billet or forging, and carburized at 1700 deg. F. in an active carburizing compound to develop a case in which there is present a network of iron carbide. The sample is cooled slowly in a carburizing box. This test does not involve any especially delicate control.

To the user difference in grain size was said to indicate that the coarse grain steel would probably respond to heat treatment more easily, but would be much more likely to be highly stressed in the quenching, and hence subject to heat treating cracks and distortion. The fracture probably will be much coarser and the impact values very much lower than with the fine grained steel. From figures in a table shown by Mr. McQuaid it was evident that for high impact values it is necessary to insist on a fine-grained steel.

To the gear maker, the grain size is especially important, as it affects the machinability and distortion; practically all the large gear makers are paying attention to it.

Gray Iron Institute to Broaden Its Research

APPOINTMENT of a director of research by the Gray Iron Institute was announced at the third annual meeting of the institute, held in Cleveland, Oct. 6. This is regarded as one of the most important steps that have been taken in broadening activities of the organization. The research director will supervise the examination of test bar specimens, set up specifications for different types of castings, act as a consultant for foundries, and assist buyers in the selection of the best kind of castings for their work.

Important accomplishments in various directions were attained by the institute during the year. These included the acceptance of the institute's trade practices by the National Association of Purchasing Agents, the setting up of a cost organization which will install the institute's cost system in plants of members, the formation of trade groups of foundries making the same class of castings and a gratifying increase in membership.

The institute's trade customs with minor changes were accepted by a committee of the National Purchasing Agent's Association at a joint all-day meeting held with the directors of the institute on the day preceding the convention. The matter must go before the Purchasing Agent's Association for final action, but it is expected that there will be no objection to the ratification of the decision of the committee.

New Officers Elected

The meeting was held at the Cleveland Hotel and, while the attendance was somewhat less than last year, the industry was quite well represented with members from widely scattered districts. Walter L. Seelbach, who has been president of the institute since its organization, presided. Acceding to his wishes, the nominating committee did not name him to head the organization for another year. Officers elected are as follows:

President, B. H. Johnson, Florence Pipe Foundry & Machine Co., Florence, N. J., formerly vice-president; first vice-president, A. E. Hageboeck, Frank Foundries Corpn., Moline, Ill.; second vice-president, Don McDaniel, Decatur Casting Co., Decatur, Ind.; treasurer, William C. Grede, Liberty Foundry, Inc., Wauwatosa, Wis., assistant treasurer, H. C. Wilson, Cleveland Cooperative Stove Co., Cleveland

Directors for three years include: J. H. Bruce, Bowler Foundry Co., Cleveland; H. S. Chafee, Builders Iron Foundry, Providence, R. I.; Don McDaniel; R. D. Phelps, Francis & Nygren Foundry Co., Chicago; and John H. Pohlmann, J. W. Pohlmann Foundry Co., Buffalo; director for one year, R. R. Monroe, Des Moines Foundry & Machine Co., Des Moines, Iowa.

B. H. JOHNSON
The New President

The new director of research is Oliver Smalley, whose appointment was announced by Mr. Johnson in his report as chairman of the Research Committee. Mr. Johnson stated that this committee spent a great deal of time in searching for a man with the proper qualifications for the position and with combined merchandising, technical and practical foundry experience. Mr. Smalley is a metallurgist and engineer. He has carried on consulting work for foundries for several years and is reported to have been very successful in his work in connection with cast iron. A native of England, he has resided in this country for several years; his home is in Brooklyn, N. Y.

Campaign On to Reduce Excess Capacity

That excellent progress was made by the institute during the year was brought out in Mr. Seelbach's annual report as president. The extent of the activities was referred to in more detail by the report of Arthur J. Tuscany, manager, and in the committee reports. The institute is in good financial condition, as indicated by the report of the treasurer, H. S. Chafee. A policy of paying as it goes is being followed. The institute does not undertake any work involving expenditures until funds are available for carrying it on.

During the year 61 new members were added and there is now a membership of over 250 companies. There is no cessation in the campaign to increase membership. The monthly trade report, Mr. Tuscany said, is proving a valuable barometer to the industry. Two wage surveys were made during the year in the United States and Canada. Considerable effort has been made to reduce the excess capacity of gray iron foundries. Fourteen companies had planned to add foundry departments for making their own castings, but ten of these had been persuaded to abandon the projects and three are now holding extensions in abeyance.

Consolidation of existing plants is another matter that has been given attention. One consolidation of foundry companies has been effected through the efforts of the organization and others are being considered. Three additional local chapters were started during the year, these being at Niagara Falls, Chicago and in northeastern Ohio. A New England chapter at Worcester, Mass., was reorganized.

Formation of trade groups making the same class of castings, with a view to effecting economies in plants having the same problems, was given attention during the year. One of these groups was formed and the organization of others is under way.

Standard Cost System Urged

UNIVERSAL adoption of the standard cost system, which was put out in January, was urged by Mr. Tuscany. Cost groups have been formed in different districts. He referred to the merchandising work done during the year by the institute, and to various publications it has issued to aid in merchandising. The standard sales agreement, he said, was well received and has been adopted by many members. A mailing list of over 5000 names of consumers, engineers and others has been prepared. Cast iron has been defended with good effect when it has encountered unethical advertising and untrue statements.

Plans for placing the standard cost system in effect were announced by

John L. Carter, Sacks-Barlow Foundries, Inc., Newark, N. J., in his report as chairman of the Cost Committee. He said that the cost system has been favorably received by the whole industry. The committee is now centering its efforts in securing its general adoption. This work has been placed in charge of Charles A. Klaus, Newark, N. J., who will look after the eastern territory. Charles E. Mitchell, assistant manager of the institute, will look after the central district and E. T. Runge, Cleveland, cost accountant, will do some of the work. The institute is now prepared to finance this program.

One of the cost experts will, if requested, visit any foundry and show the management how to install the system. Later he will make a second visit. This work will be done free of charge; but if additional visits are called for, these will be charged for, but at a considerably lower cost than would be charged by outside accountants.

A tentative budget covering work for the ensuing year was suggested by the Finance and Budget Committee, the report of which was read by Mr. Chafee in the absence of the chairman, H. J. O'Neil, Western Foundry Co., Chicago. Among the more important items on the budget are $12,000 for research and $9,100 for cost work.

Merchandising Gray Iron Castings

Preparation of a sales book on gray iron castings was announced by J. C. Bruce, in his report as chairman of the Merchandising Committee. This will be issued in bulletin form and will show with photographs interesting and unusual uses of gray iron castings. The committee has selected as a tentative slogan for the industry, "Gray iron for rigidity or permanence." However, it is not wholly satisfied with this slogan and asked that other slogans be submitted for consideration. The committee has investigated alloy costs and expects to prepare data showing the cost of using various percentages of alloys in castings.

It was stated that not much headway could be made in promoting gray iron castings among engineers until classifications of gray iron are completed, progress in this work having been delayed by not having a director of research. Mr. Bruce, who made his report before the announcement of the selection of a director of research, said that he hoped that the man selected would be of high caliber and could advise the foundries as to cupola and other problems. The same general specifications for cast iron, he said, are now followed by buyers except in the automotive industry. In his opinion the adoption of a trade name by some makers of castings would help some, but would not bring a great deal of business, as engineers are not inclined to buy castings of a grade bearing a trade name, eliminating competition of other foundries.

Several hundred test bars were examined during the year, with a view to establishing tentative standards for different castings, as was brought out by the report of Mr. Johnson, chairman of the Research Committee. The examination of test specimens will be continued under the direction of the director of research.

The Trade Practice Committee recommended postponement of a trade practice conference on eliminating wasteful and harmful practices until the institute has a larger membership. The report was read by Mr. Tuscany in the absence of R. M. Hill, East St. Louis Castings Co., chairman.

OLIVER SMALLEY
Research Director

Other reports included that of the Membership Committee, read by H. R. Rockenbach, James Yocum & Son, Inc., Philadelphia, in the absence of the chairman, Charles E. Scherer, Davenport Machine & Foundry Co., Davenport, Iowa, and of the Trade Information Committee, submitted by its chairman, Leo J. Filstead, John C. Kupferle Foundry Co., St. Louis.

How Research Is Benefiting Industry

"THERE is more need for research in the United States to determine price than for scientific research. If we could arrive at equitable prices our economic problems would be solved." So declared Dr. Zay Jeffries, consulting metallurgist, General Electric Co., National Tube Co., and Aluminum Co. of America, who addressed the institute on "How Research Is Benefiting Industry." In his interesting talk he dwelt on economic topics, the development of the gray iron industry and research work.

"You have seen remarkable changes in the cast iron industry in the past few years, and the field for research in gray iron has only just begun," he said. Foundrymen are being trained to use more expensive materials. In his opinion alloy iron will be used more and more. While its use may not increase to the same extent as alloy steel, the trade will see the handwriting on the wall. High-alloy cast irons will sell and fill useful needs. He referred to some foundry products, such as semi-steel, and processes as being on the border line.

More is known of pearlitic iron than ever before. With knowledge about treatment of molds, temperature of molds, etc., he saw as a possibility the foundrymen setting the mold, pouring the metal and having it come out as pearlitic iron. A composition of 20 per cent Monel metal, 12 to 13 per cent nickel, 7 per cent copper and other alloys, including chrome and manganese, having a coefficient of expansion 50 per cent greater than cast iron is being successfully used in cylinder walls, the speaker said.

Decries Over-Production

Pointing out that excess foundry capacity leads to price cutting, Dr. Jeffries stated that there are 2500 foundries making aluminum sand castings, few of which are making any money. He believes the same overproduction exists in the gray iron industry. Under the circumstances, the foundry industry seems almost helpless in its attempt to make a fair return on its investment. However, the foundries must be widely scattered, deliveries and freight rates are important factors and a foundry must be near the place of consumption.

While he regarded as feasible a system under which foundrymen work together in compiling information, Dr. Jeffries declared there is danger in community research. If all in one group have the same information, no one has any special advantage. There are two ways of conducting research, he said. The foundry may make its own research and capitalize on its results. Under the second method foundries may pool their information and compete with each other in trying to get business. In the second case the public may benefit, but the industry will not. In his opinion the maximum progress will not be made until three groups profit by new developments. One is the stockholders, the second the employees and the third the public or consuming group.

At present, he said, we have overcapacity production because of overcapacity consumption. He believes that production and consumption should be kept at a high rate, saying that men are not contented unless they produce and consume in large volume.

What Product Research Might Have Done

An industrial organization, in the speaker's opinion, should consider research from a broad aspect and should keep its activities in balance. As an

example of an organization that did not keep its research activities in balance, Dr. Jeffries referred to the Ford Motor Co. This company, he said, had a wonderfully efficient organization when it was making the Model-T cars. Then came a time when the public would not buy that model.

If Ford had spent $1,000,000 a year in product research, production of the present Model-A cars would have meshed with the discontinuance of the Model-T and there would have been no long shutdown. If Ford could have developed the Model-A over night, or even in a month, he could have paid $250,000,000 for the development. The Ford shutdown affected the whole United States. While his plant was down a heavy demand developed for cars and other manufacturers increased their capacities. As a result the country today has a tremendous excess automobile manufacturing capacity, or more than it would be if the Ford company had kept up its product research with its other activities.

Selling at a Profit

Industrial merchandising was discussed by J. E. Wiley, King & Wiley & Co., Inc., Cleveland advertising agency. The speaker defined merchandising as making a product more desirable, pointing out its accessibility, making it better known and making the proper profit. The foundry industry, he believes, should adopt standard physical and chemical properties for castings, so that the buyer will know the quality he is getting. It should have a market research engineer and should find why replacements of castings are made and if changes are justified. It should also adopt standard specifications for certain uses.

A standard method of using a foundry cost system was urged by A. C. Denison, president, Fulton Foundry & Machine Co., Cleveland. He presented figures to show that when direct molding, core making, cleaning and melting department costs are distributed in different ways there is a range of 1½c. a lb. for the same casting, in the cost of figures of foundries using the same standard cost system. As a result, one foundry will be low on one casting and high on another, and the second foundry will be high on the first casting and low on the second. The customer naturally takes advantage of the situation.

Uniform Distribution of Costs

In his opinion foundries can almost run themselves into bankruptcy by not using a uniform system of distributing costs. He said that foundries in one territory should use a uniform cost distributing system for certain classes of castings. President Seelbach declared there is no advantage in having a standard cost system and different ways of figuring the work. Mr. Carter said that he hoped the foundry industry would reach the point of figuring direct cleaning costs, but that it is too early now to get them to do it.

A. E. Grover, cost accountant for the National Machine Tool Builders' Association, stated that that association in adopting a foundry cost system had copied the Gray Iron Institute system almost 100 per cent.

A resolution was adopted urging members during the present industrial depression to furnish employment for as many men as possible. It was felt that it would be better to employ more men on short time than fewer for longer time.

Following a group luncheon, an interesting talk on the consumer and producer profit through the trade association was given by Philip P. Gott, assistant manager, Trade Association Department, Chamber of Commerce of the United States. At the annual dinner in the evening, "Some Problems of Our Economic Future" were discussed by James T. Begg, Cleveland. The convention activities were summarized by D. M. Avey, editor of *Foundry*.

Says Trade Associations Face Crucial Test

Trade associations are facing a crucial test, according to Charles F. Abbott, executive director of the American Institute of Steel Construction, who addressed the convention of the National Association of Ornamental Iron and Bronze Manufacturers at Baltimore, Oct. 15. Industrial institutes have concentrated on technical improvements, elimination of waste and other reforms, and now it is necessary that they bend their efforts to improve the profits in business, he said.

"With all the material facilities at our hands," said Mr. Abbott, "are we able to insure normal profits to the normal business enterprise? With all the skilled workmanship at our control, with all the banking resources to aid us, and all the raw materials within our reach, have we found an adequate means of insuring normal profits to our undertakings?

"It is a notorious fact that we have not, and it is an even more notorious fact that many of our business executives are unwilling to test the effectiveness of such palliatives as we have to offer. This is by far the gravest problem before us today."

Mr. Abbott analyzed the functions of a trade institute and concluded: "During the past 10 years the industrial institute has proved itself and made its greatest progress. What I claim for this method of insuring business profits is the result of no idle dream, but is based upon practical observation and test. Under wise management the institute can effect a cure of most of the competitive problems in business, reduce litigation and lighten the duties of those entrusted with the administration of our laws.

"But the work demands the undivided support of each unit in the industry. The institute must have a competent staff and it must receive the financial as well as the moral support of all members of the industry. We have no system of compulsion in this country. We have no way of compelling a company to cooperate. I sincerely believe it is best for the public at large that such is the case. Our programs, as a consequence, are equable, tolerant and constructive. The good results are our suasion, and the certain talisman of the efficiency of industrial cooperation."

Aggregating 977,000 metric tons, the quantity of iron ore produced in Tunisia in 1929 was the largest in five years, according to Vice Consul Charles B. Beylard, Tunis. The production in 1928 was 909,000 tons. Exports totaled 974,416 tons in 1929, of which 361,013 tons went to the Netherlands, 211,074 tons to Great Britain and 122,124 tons to France.

General Electric Orders $77,338,074 in Quarter

General Electric Co. orders received during the third quarter of 1930 amounted to $77,338,074, compared with $116,688,014 for the corresponding quarter last year, President Gerard Swope has announced. Orders received during the first nine months of 1930 amounted to $267,651,832, compared with $337,404,470 during the corresponding period last year.

Sales billed for the first nine months of 1930 amounted to $287,886,541.05, compared with $301,812,808.55 for the corresponding period last year.

Use of Coking Coal Off 21 Per Cent in August

WASHINGTON, Oct. 10. — Consumption of coking coal at the 86 by-product plants reporting to the Bureau of Mines amounted to 5,293,815 net tons in August. This is a decrease of 1,403,604 tons or 21 per cent, when compared with August, 1929. The largest percentage of decrease was reported for the Mountain and Pacific region, where consumption fell off by 40.2 per cent, but decreases are shown for all other producing regions with the exception of New England, where a gain of 20.2 per cent took place.

American Machine Tool Production Gained Heavily in 1929

PRODUCTION of machine tools in the United States in 1929 is reported by the Bureau of the Census at $172,349,996. This was an increase of 60.9 per cent from the $107,101,652 reported by substantially the same number of establishments in 1927—the next preceding census year. In 272 establishments in 1929 the wage earners numbered 46,924 (average for the year). Their wages aggregated $75,625,004, or an average of $1,612 per operative. These figures compare with 276 establishments in 1927 employing 31,986 wage earners and paying them an aggregate of $46,771,272, or an average of $1,462 per operative.

In the tables and diagrams the production of the principal items in the machine tool classification are shown in some detail, both as to number of units and reported values. This analysis shows a substantial gain in almost every classification. There were, however, a few declines recorded, of which the principal items were in pipe cutting and threading machines, and in riveting machines, the latter sustaining a heavy loss.

Among the subsidiary classifications there were losses also in some particular lines. Thus, the output of electric portable drills, while increasing in number, decreased about 13 per cent in value. The output of

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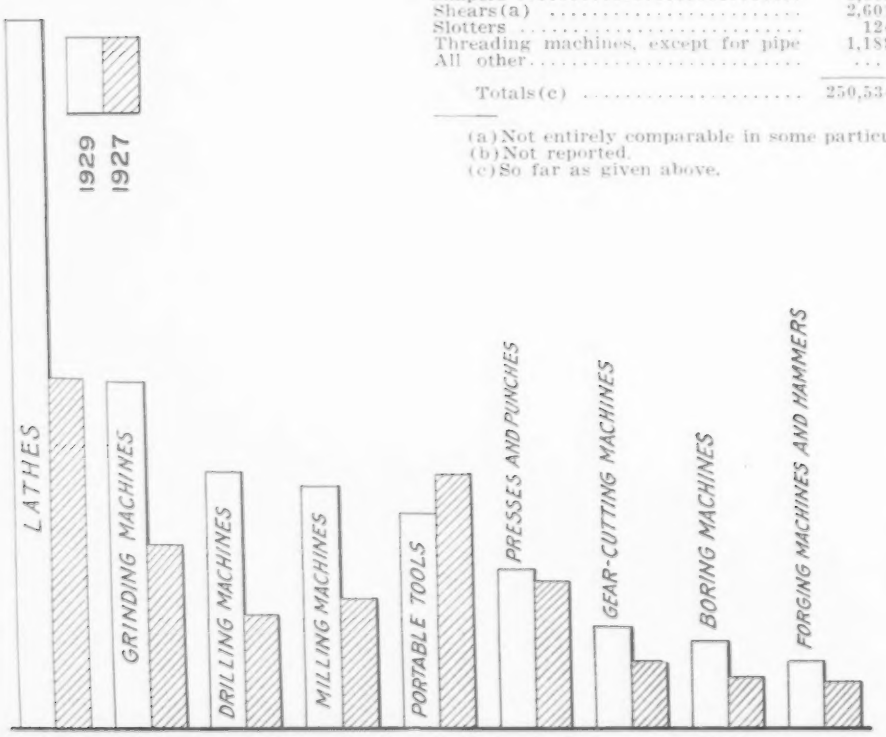
UNIT value of machine tools in 1929, *omitting portable tools, averaged* $1,900, *compared with* $2,007 *in* 1927

Machine Tool Production in 1929, by Value and Quantity

(Including Comparisons with 1927*)*

	1929		1927	
	Number	Value	Number	Value
Bending machines	2,497	$1,482,087	439	$368,643
Boring machines	734	5,576,969	598	3,352,394
Broaching machines	259	396,726	255	371,827
Cutting-off machines	3,165	1,134,481	2,056	602,434
Drilling machines(a)	9,500	17,165,579	6,891	7,744,796
Forging machines	832	2,898,746	663	2,481,357
Gear-cutting machines	1,757	6,625,596	1,267	4,416,656
Grinding machines(a)	18,806	23,234,892	4,866	12,250,201
Hammers, stationary	(b)	1,483,915	(b)	560,459
Keyseaters	(b)	94,999	(b)	(b)
Lathes	16,751	48,459,576	12,877	23,958,448
Milling machines	5,556	16,077,143	2,978	8,545,125
Planers	249	2,270,108	196	1,867,449
Pipe cutting and threading machines	976	1,180,190	2,281	1,344,145
Portable tools(a)	173,616	14,323,958	159,254	16,801,574
Presses	9,176	9,442,039	(b)	8,770,001
Punching machines, stationary	320	1,038,331	638	862,118
Riveting machines	779	178,426	1,368	673,307
Shapers	1,648	2,760,407	986	1,628,775
Shears(a)	2,601	1,947,813	1,771	1,308,169
Slotters	124	184,921	36	182,154
Threading machines, except for pipe	1,188	2,480,098	1,135	1,613,116
All other	....	11,912,996	....	7,398,504
Totals(c)	250,534	$172,349,996	200,555	$107,101,652

(a) Not entirely comparable in some particulars.
(b) Not reported.
(c) So far as given above.



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TWICE the 1927 *value of lathes was made in* 1929, *as shown at left. Nearly all other items gained, but portable tools did not*

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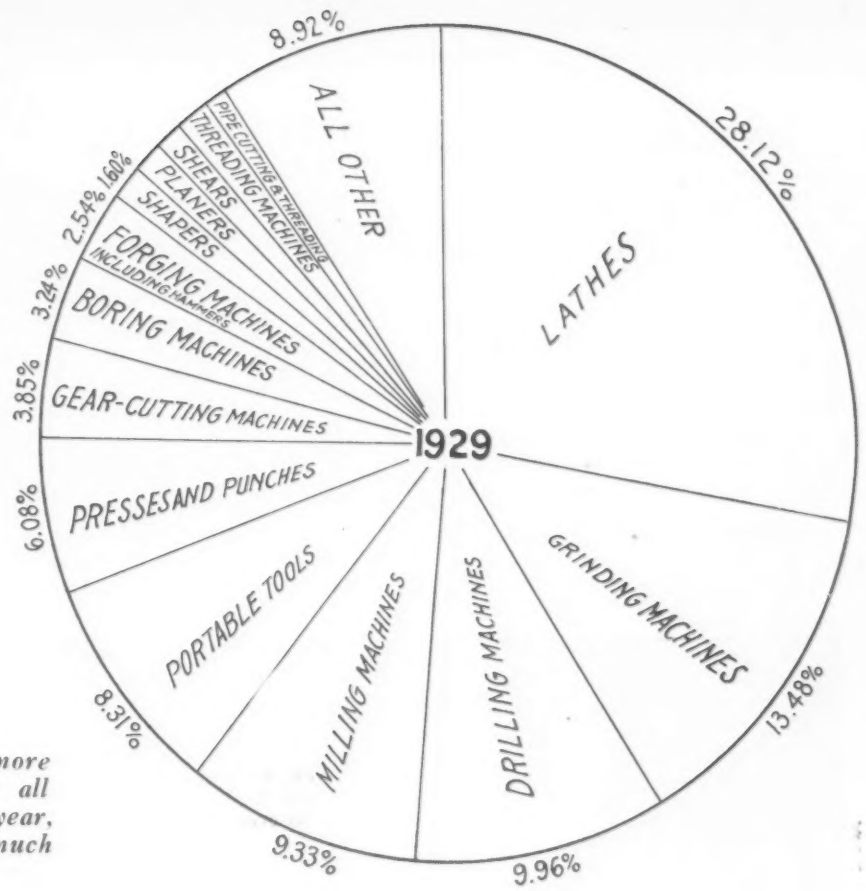
electric grinders declined about 7 per cent in number and almost 50 per cent in aggregate value. That of pneumatic hammers dropped about 4 per cent in number and more than 50 per cent in value.

Large gains were made in lathes, the production of which more than doubled, in grinding machines, in milling machines, which almost doubled; in drilling machines, in gear-cutting machines, boring machines, and in a number of smaller classifications.

Much of the detailed data in the narrow table is made public for the first time. In many instances comparative figures for 1927 were not available. Hence this table stands by itself, with a more minute subdivision of the principal groups than has heretofore been accessible.



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LATHES constituted more than one-fourth of all machine tool output last year, and more than twice as much as the second item

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Machine Tool Production in 1929

(Subdivision of Some of the Items in Main Table)

	Number	Value
Boring machines:		
Horizontal	159	$932,237
Vertical	257	1,363,881
Combined boring, drilling and milling, etc.	222	2,297,245
Other	96	983,606
Cutting-off machines:		
Band saw	324	194,098
Cold saw	161	297,908
Hack saw	2,680	642,475
Drilling machines:		
Bench	1,277	183,973
Horizontal	188	526,205
Vertical:		
Multiple-spindle(a)	913	4,349,091
Standard	2,183	1,588,367
Sensitive(a)	3,659	3,749,164
Radial	1,280	4,579,683
Other	....	2,189,096
Forging machines:		
Bolt, nut and rivet	832	2,194,927
Bulldozers and other	....	703,819
Gear-cutting machines:		
Hobbing, generator, etc.	1,628	6,118,010
Formed rotary-cutter type:		
Spur	73	283,967
Bevel	56	223,619
Grinding machines:		
Cutter, drill, knife	2,162	1,573,766
External cylindrical:		
Plain	1,358	6,200,946
Universal	583	1,137,378
Internal cylindrical	920	4,323,439
Surface	1,784	3,554,368
Emery-wheel	11,999	364,552
Other	....	6,080,443

Lathes:		
Automatic:		
Bar	3,339	12,353,441
Chucking	1,398	6,002,597
Bench	1,026	337,739
Engine:		
Swing 16 in. or less	6,265	5,321,765
Over 16 in., including 22 in.	1,525	3,177,746
Over 22 in., including 36 in.	674	2,356,963
Over 36 in.	41	482,798
Gap and all other	....	3,123,355
Polishing, buffing, grinding	1,479	675,857
Turret:		
Hand screw machines	1,004	2,717,865
Horizontal, vertical and other automatic	....	11,909,450
Milling machines:		
Hand-feed	312	129,803
Power-feed:		
Plain	1,090	2,690,851
Universal	2,270	5,840,142
Vertical	453	1,341,362
Lincoln type	826	2,546,504
Planer type and other	605	3,528,481
Planers:		
Standard, 36 in. and under	61	359,627
Standard, over 36 in.	57	807,835
Standard, open side	86	839,395
Special	45	263,251

Portable tools:		
Drills, electric	85,521	3,226,470
Drills, pneumatic	13,712	1,744,503
Grinders, electric	31,862	1,463,569
Grinders, pneumatic	10,072	1,065,625
(b)Hammers, electric	3,225	484,075
(b)Hammers, pneumatic	29,224	1,694,961
Woodworking	....	923,226
Other, including flexible-shaft tools	....	3,721,529
Presses:		
Forming and hydraulic	609	1,756,371
Stamping, foot	273	52,195
Stamping, power	4,343	6,608,334
Punch	1,634	1,001,324
Arbor, hand and other	2,317	23,815
Shapers, horizontal:		
Stroke not over 20 in.	1,026	1,415,539
Stroke over 20 in. to 28 in. inclusive	431	837,774
Stroke over 28 in.	191	506,994
Shears, power:		
Combination punch and shear	227	347,734
Rotary	550	193,591
Straight	746	961,892
Alligator and other	281	421,900
Threading machines(c):		
Die type	636	1,255,286
Milling type	150	680,432
Tapping machines	402	544,380

(a)Includes a few with number not reported.
(b)Chipping, riveting, calking, etc.
(c)Except for pipe.

Large Scale Output of Wrought Iron by Aston Process Inaugurated

LARGE-SCALE production of wrought iron by means of the Aston process is now being carried on by the A. M. Byers Co., Pittsburgh, at its new plant near Ambridge, Pa., which was officially opened on Oct. 8. While production of wrought iron under the new process has been under way commercially at a leased plant at Warren, Ohio, for some time, the new plant provides larger quarters and adequate facilities not heretofore available at the old quarters, where operations were performed on a small scale only.

Dedicatory ceremonies at the plant were attended by some 500 business men and industrialists, who were given an opportunity to view the process after brief talks by A. M. Beale, president of the Byers company; Dr. James Aston, inventor of the new process, and Secretary James J. Davis of the Department of Labor.

The buildings making up the plant are located on a 126-acre tract on the Ohio River 20 miles below Pittsburgh, and the present installation has a monthly capacity of 45,000 to 50,000 tons of wrought iron. The principal steps of the operation are the obtaining of pure iron and slag, the processing or mixing of the iron and slag, decanting of the surplus slag and the pressing of the ball of iron into a bloom. Subsequent blooming and finishing mill operations are carried on in essentially the same way as in any modern steel plant.

Bessemer iron in pig form is melted in three cupolas, the charge consisting of iron, coke and limestone. At a later date it is the intention of the company to erect a blast furnace and a battery of coke ovens in order that a continuous supply of hot metal can be available. In the melting operation a special treatment is utilized to insure a thorough removal of sulphur. Air to burn the coke is supplied by three blowers.

After the iron is melted, it is tapped from the cupola into a ladle car and in this is transferred to the converters. After the iron has been placed in the converter, it is rotated to a vertical position and a current of air at approximately 20-lb. pressure is blown through the bottom of the converter and passes up through the metal. The air oxidizes the carbon, silicon and manganese in the iron. When this operation is finished, the converter is tilted and its contents are allowed to flow into a hot metal ladle resting on a car.

The car and ladle are then drawn by a cable to a position in front of the processing platform and the metal is poured into a processing ladle. This ladle acts on a specially designed car which is so constructed that it can impart to the ladle, when tilted, a forward and backward, as well as a lateral, motion to insure even and uniform distribution of metal. Four processing ladles on cars are available on the platform.

After being melted in the cupola and purified in a converter, hot iron is poured into a processing ladle. The ladle is so constructed that it can be tilted forward, backward and sideways to obtain a proper mixture

Mixing With Slag

Slag for the mixing operation is obtained in two tilting open-hearth furnaces, where charging is in such proportions that the product will be of a definite predetermined composition. When at the desired temperature, the liquid slag is tapped into large processing cups in an amount sufficient to obtain the depth of bath desired. The cups are carried on a car, several of which make up a train. Pulled by an electric engine, the train is drawn over a circular track to a point beneath the processing platform where the cup containing the slag can receive the molten purified iron.

While the cup with its bath of slag stands below the processing ladle containing the pure iron, the ladle is tilted enough to allow a small stream of iron to flow into the bath. The action that ensues is termed processing. When sufficient iron has been poured, the train is moved to a position near a large press where a crane raises the cup and decants the surplus slag. As the slag flows from the cup in which processing has occurred, a ball of iron, weighing about 6000 lb., remains at the bottom. The crane then carries the cup to a gigantic press, where the ball is made to fall on a square platform section which forms part of the press.

900-Ton Press Used

The 900-ton press in which the ball is given the form of a bloom has a box-like chamber. The bottom of this chamber can be elevated to the level of the top of the sides, and it is on this square section that the ball is deposited. With the ball on it, the section lowers to its normal position and immediately the rear wall of the chamber is forced forward and the ball is squeezed so that two of its sides are flat. The mass is then turned and the same force is again applied. This pressing action is repeated until a bloom about 17 x 24 in. is formed. The bottom section is then raised, and when at its top position a pusher

(*Concluded on page* 1084)

High-Speed Gear Generator for Automobile Plants

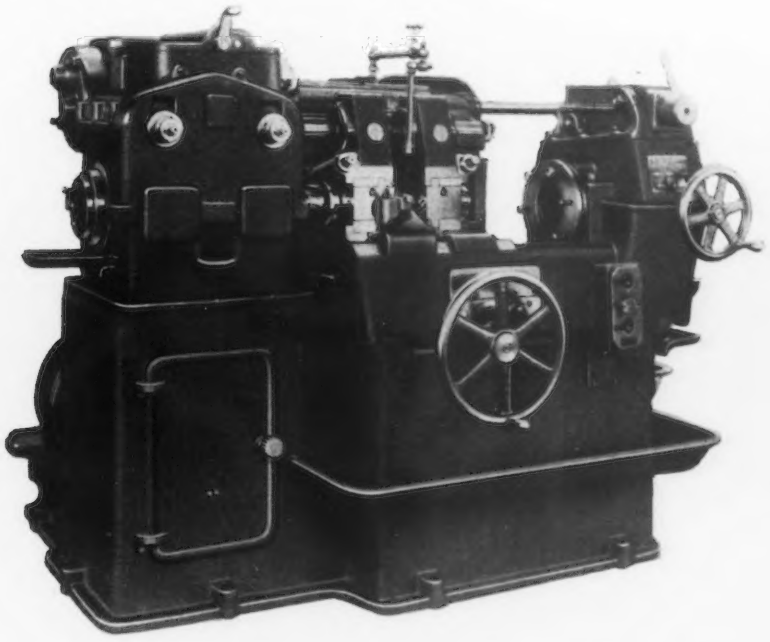
HIGH-SPEED operation, 850 strokes per min., and precision are features of a new size Sykes gear generator which has been placed on the market by the Farrel-Birmingham Co., Buffalo. This machine, designed primarily for the automobile industry, has a diameter range of ¼ to 12 in., and will cut all pitches from 24 to 4 D.P., inclusive. It is designated as the I-A.

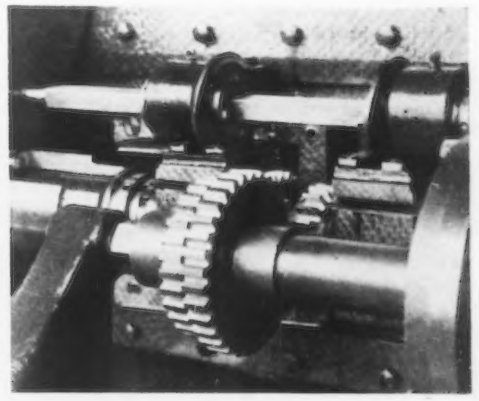
Although Sykes gear generators are noteworthy from the fact that they cut continuous tooth herringbone gears having sharp apices, it should be noted that they will cut all other types of gears connecting parallel axes.

The new machine is adapted for either straight-tooth spur gears or single helical gears. An important feature is that it will cut both gears of a cluster at one operation whether the pitches are the same or different on each gear. The machine may also be used for cutting gangs of gears. It utilizes two cutters; these are mounted face to face so that they cut in opposite directions.

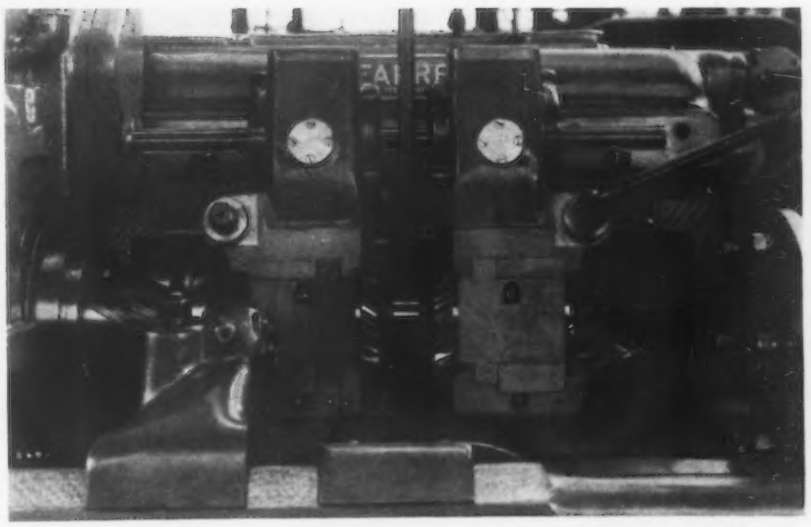
Herringbone gears having a groove in the center of the face can also be produced. Such gears can have a different pitch on the right-hand helice to that of the left-hand helice, and therefore the machine is suitable for cutting herringbone gears of dual-pitch type.

The machine is of rigid construction. The main spindle, of large diameter, has a 3¾-in. hole clear through it. A substantial support is provided for the outer end of the work arbor. The maximum distance from the end of the main work-spindle to the arbor support is relatively large, permitting a wide range of work to be mounted in the machine. Pinions having long shafts, combination gears of the cluster variety, and spline shafts, can be easily handled. Gears integral with crankshafts can be cut and the machine is adopted for generating cams and other irregular shapes.





Cutting both gears of a cluster combination simultaneously



View showing cutter mechanism, with two helical gears in position

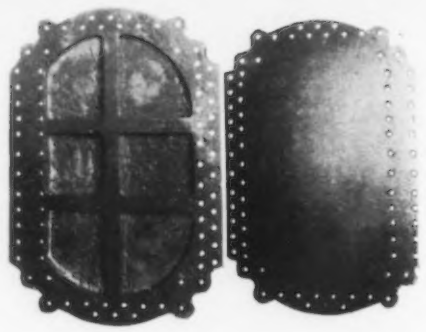
Standard cutters are 4 in. in diameter, but cutters up to 6 in. may be used. With cutters larger than 4 in. gears of 3 D.P. can be cut. This new machine is fully automatic. The work is fed automatically toward the cutters in increments selected to suit the requirements of the material to be cut and the total depth of the teeth. The machine stops automatically upon completion of the work; at the same time the work is automatically withdrawn from the cutters. Setting up of the machine is accomplished conveniently. All adjustments and setting positions for the cutters are controlled by one conveniently located handle.

The guides, both helical and straight, have double instead of single grooves as heretofore. The shoes engaging with these grooves are easily adjusted to eliminate backlash and to compensate for wear. Cutter spindles are case hardened, ground and lapped, and the bearings are also case hardened and lapped; it is claimed that this feature prevents any appreciable wear over a long period. A new relief mechanism featuring positive and silent operation is employed.

Floor space of 4 ft. 7 in. by 6 ft. is occupied by the machine. The shipping weight is 7500 lb.

The St. John X-Ray Service Corporation, 505 Fifth Avenue, New York, has arranged with the Westinghouse X-Ray Co., Inc., to sell Westinghouse equipment in the industrial fields.

TOP and bottom are shown of casting which is attached to the dipper door as appears in left-hand view



Manganese Steel Casting for Dipper Doors

REINFORCEMENT for dipper doors is a new feature put out by the American Manganese Steel Co., Chicago Heights, Ill. A casting, made of AMSCO manganese steel, is designed to take the wear. It can be applied to any dipper door that is flat inside and that has not become distorted. The Meyer "Turtle Back" (patent applied for) is convex to the work, and of ample size and strength to protect the door and mechanism from severe shock and distortion.

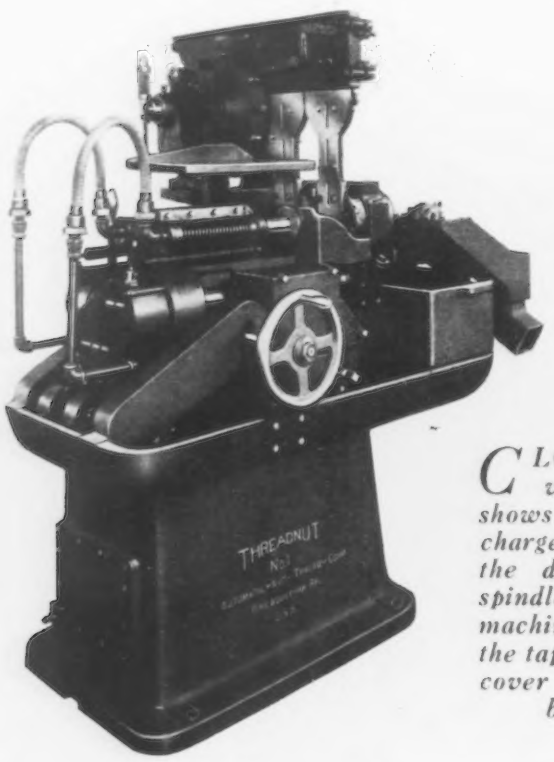
This new unit is designed to reduce wear and eliminate the bothersome door and latch troubles caused by falling rocks, the shock from which permanently distorts door sheets. It is made to suit all dipper sizes, and is quickly and easily secured to inside of the door, so as not to interfere with door braces and latch mechanisms.

Double Spindle Automatic Nut Tapper

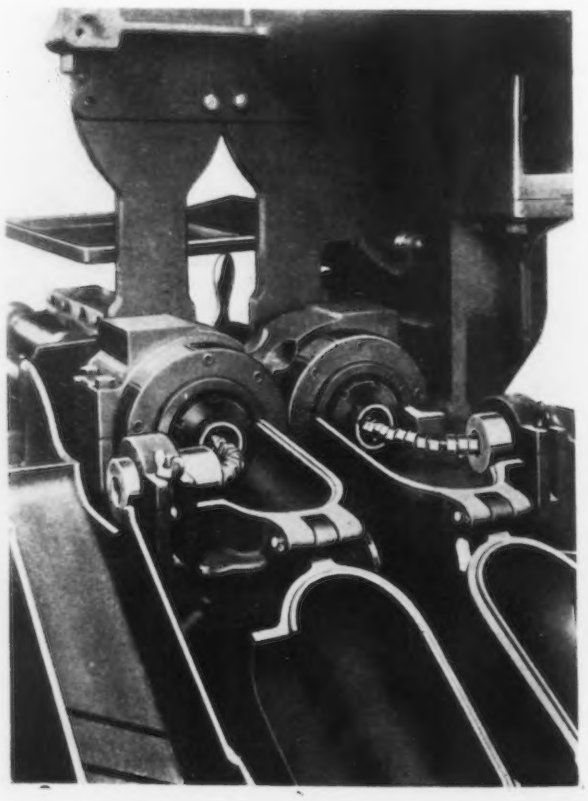
A DOUBLE - SPINDLE automatic nut tapping machine for ¼ to 7/16-in. U. S. or S.A.E. standard hexagon and square nuts has been added to the line of the Automatic Nut-Thread Corporation of 3617 North Eighth Street, Philadelphia. This machine, designated as the Threadnut No. 1, uses bent shank taps, the taps remaining stationary while the nut blanks are revolved. A special feature is that the two tapping spindles are fed by a single rotary-disk hopper. A centrifugal pump is provided for each spindle, the coolant being pumped through flexible steel hose directly to each tap. Principal revolving parts are mounted in ball bearings; all gears are of steel, are entirely inclosed and run in oil.

Safety features include provision against spindle clogging; should one of the spindles become clogged the nut pusher on that spindle will automatically compress and the other spindle will continue operating until the operator has a chance to remove the obstruction.

Change gear boxes are accessibly located to facilitate making changes in tapping speed or lead. The standard machine is furnished with single clutch pulleys for belt drive, but provision is made for the application of motor drive. From the motor, which is mounted on hinged brackets at the



CLOSE-UP view shows the discharge end of the double-spindle tapping machine, with the tap housing cover thrown back

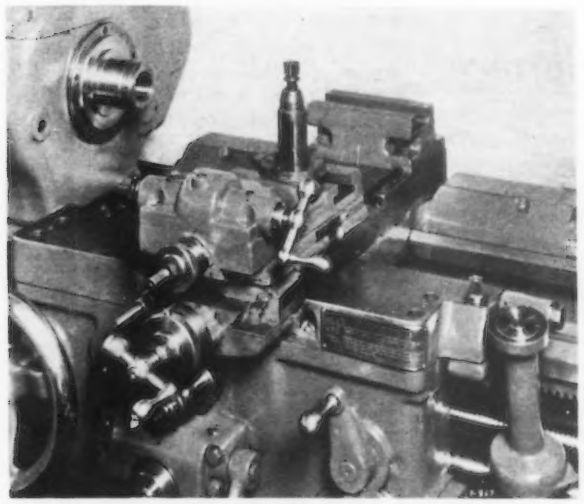


rear of the machine, the drive is through either multiple V-belt, silent chain or flat belt.

High production and accuracy are claimed for this machine. In tapping on ⅜-in., 24 S.A.E. hexagon nuts at a cutting speed of 45 ft. per min., the output is said to be 3120 an hour.

Tool Blocks for Reed-Prentice Lathes

NEW front and rear tool-block construction for the new model sliding gear head engine lathe built by the Reed-Prentice Corporation, Worcester, Mass., has been announced.



Compound rest and T-block and post forming new front and rear tool-block construction

The device consists of a compound rest at the front and a plain T-block with tool-post at the rear. The rear block is a steel casting and has independent adjustment, while the lower slide is cast integral. The compound block is of steel with screw adjustment which permits a greater clearance and the use of a large crank handle. The screw is operated from the usual position, or from the shaft mounted at right angles and connected to the screw through bevel gears. The device is also furnished with separate screw for adjustment in and out of the rear block. This permits independent operation of rear tools without disturbing the front tool set-up. The screw is furnished with quick hand feed and micrometer dial for positioning of rear block.

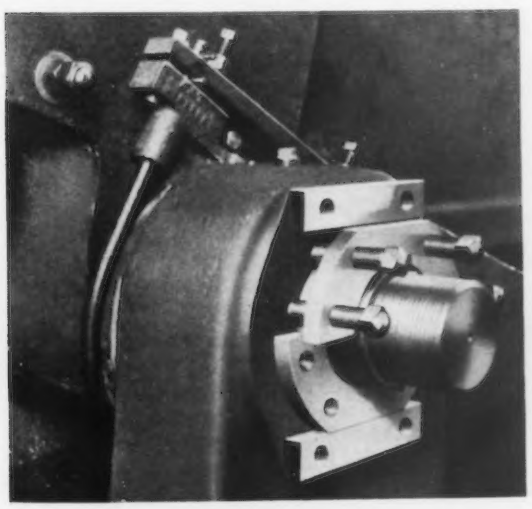
Better Accessibility for Shear Bearings

TO overcome the difficulties of getting at the fulcrum pin bearing in an alligator shear, a new arrangement for mounting this bearing has been devised by the Canton Foundry & Machine Co., Canton, Ohio. In the previous design, rebabbitting or rebushing the bearing has usually meant taking out the fulcrum pin, removing the head and practically dismantling the shear.

To simplify rebushing, the new arrangement includes a split gun-metal bushing, as shown in the two detailed views. The fulcrum pin now used, in conjunction with two castellated nuts, serves as a tie to prevent the shear-bed from spreading.

When this bearing becomes worn and needs rebushing, this can be accomplished without taking out the fulcrum pin and without dismantling the shear. The complete bearing on both sides of the shear can be rebushed in less than an hour.

After the castellated nuts are removed, the hardened steel collars and the cast steel clamping plates attached to the shear are taken off. Then the four cap screws taken from the clamping plate are inserted in tapped holes in the flange of the gun-metal bushing. By continuing to turn these cap screws, they are thrust against the bed of the shear and serve as pulling screws to remove either the top bushing or the bottom, or both.



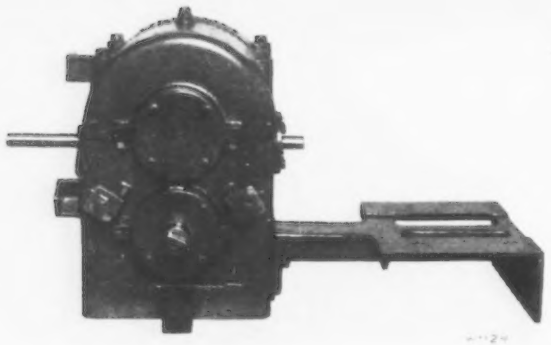
Assembled unit in place on shear (Right). At left is shown the method of disassembly. Castellated nut, steel collar and clamping plate have been removed and pulling out of the top bushing is under way

Heavy-Duty Brakes Are Spring and Magnet-Operated

A LINE of band-type, clapper-magnet-operated brakes for d. c. motors is being put out by the General Electric Co. These brakes were designed primarily for heavy-duty service such as cranes, steel mill auxiliaries, hoists and similar applications. Simplicity and long life are claimed.

The new brake operates in the same way as the external contracting band-type automobile brake. It is applied by a spring and is released by a magnet. It can be connected either to operate in synchronism with the starting and stopping of the motor, or to operate independently. One type uses a series-wound coil and the other, a shunt-wound coil. In the case of independent action, the motor control is provided with a "drift" point, which takes power off the motor but does not apply the brake.

Mechanically, the brake is very strong, being fabricated from bar stock. One size of bolt heads and nuts is used for all brake adjustments, making it necessary to use but one size open-end wrench. Coil terminals are secured to the magnet frame.



SPEED control of this gear unit, intended for coal stoker and similar service, is from the outside

Two-Speed Gear Unit for Stoker Service

A TWO-SPEED gear unit of inclosed dust-proof split housing type for coal stoker and similar service has been placed on the market by Gears & Forgings, Inc., Cleveland.

Speed control is from outside of the unit by means of a ball and socket shift lever which operates a heat-treated alloy-steel clutch. This clutch is of ten-jaw type, facilitating prompt engagement. Gears and shafts are made of forged nickel steel, heat treated, ground, and hardened to give maximum toughness and wear. The worm gear is of S.A.E. 65 bronze. The gears are accurately generated; they are inspected after each operation and given a final test on fixtures before assembly. Principal bearings are of the anti-friction type, accurately mounted. The housing, of compact design, is reinforced with ribs.

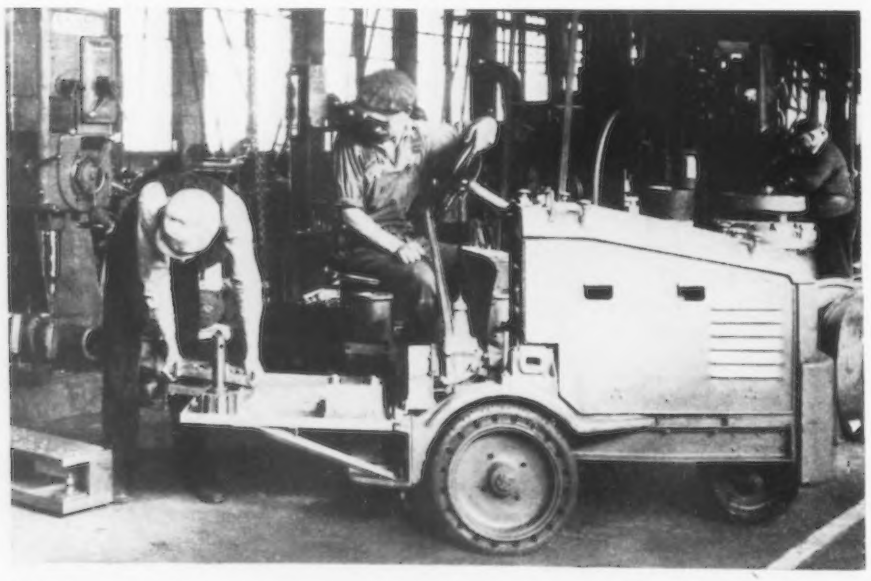
The arrangement of gears is such that the oil level is maintained below the input and output shaft, thus preventing oil leakage. All gears and bearings are lubricated by a simple splash system. Before shipment each unit receives a 5-hr. running test. The units are finished in a dark green machine enamel that is both heat and moisture resisting.

Gasoline Tractor for Quick Deliveries

FOR quick deliveries about industrial plants the Clark Tructractor Co., Battle Creek, Mich., has introduced the "Stock Chaser," here shown. The machine consists of a three-wheeled gas-propelled tractor equipped at the rear with a 29½ x 33½-in. steel platform box having load capacity of 500 lb.

This tractor is especially designed for taking tools, jigs and fixtures from tool room to machines, picking up special parts from storage and delivering them to processing and machining departments, and for carrying mail, shop orders, etc., from one department to another. In large plants it is run on regular time schedules, stopping at designated stations for deliveries and pickups.

By removing the rear platform of the unit, which can be done in a few minutes, the equipment can be converted into a factory tractor with standard trailer coupler, capable of hauling 25 tons on trailers through narrow aisles and along crowded platforms.



Tools, jigs and fixtures may be delivered quickly to various shop departments

New Bevel-Geared Universal Lathe Chuck

CLOSE accuracy and the strength necessary to meet modern production methods, including the use of tungsten-carbide tools, are claimed for a new line of bevel-geared scroll universal lathe chucks announced by the

Westcott Chuck Co., Oneida, N. Y. Twelve standard sizes, from 3 to 24 in., are made.

Features stressed by the company are: One-piece bodies, assuring maximum strength; use of steel forgings exclusively in the 3, 4, 5 and 6-in. chucks, while bodies of larger sizes are of semi-steel or electric steel; and use of special steels for the jaws, scrolls and pinions.

The 18, 21 and 24-in. chucks are of extra-heavy type. Sizes above 24-in. are furnished to order. These chucks will be furnished with two sets of jaws, with one set for either outside or inside chucking, or with two-piece reversible jaws.

National Lock Washer Co., Newark, N. J., has completed a new factory building with 50,000 sq. ft. of floor space for the production of car window equipment, marine speedometers and the machining of drop forgings.

A preliminary conference looking to the simplification of steel office equipment will be held on Oct. 16 at the William Penn Hotel in Pittsburgh. P. H. H. Dunn of the Division of Simplified Practice, Department of Commerce, will preside.

No Improvement in Demand Is Indicated

BY LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

STEEL ingot production fell off much more than usual for the season in September, reaching a new low level for the current recession and the lowest since the bottom levels of 1924. Our adjusted index is now 72.7 per cent of normal, which compares with 80.2 per cent in August.

There is no indication of any improvement in demand sufficient to warrant an upward trend in steel production. The seasonal peak is reached in October, and seasonal forces make for a decline in November and December. It now seems practically certain that any gain in October will be less than seasonal, and that ingot production will decline during the rest of the year. It is likely to go lower than in 1924.

Unfilled orders of the Steel Corporation should normally be at their lowest in June and rise thereafter. Actually, they increased less than usual last July and fell rather sharply in August and September. At 3,424,000 tons on Sept. 30, they are the lowest, considering the season, since the end of November, 1927. The adjusted index of unfilled orders during recent years has declined in September only in 1921, 1923 and 1927—all years of cyclical recession.

One May Well Ask, Why Should Steel Prices Go Lower?

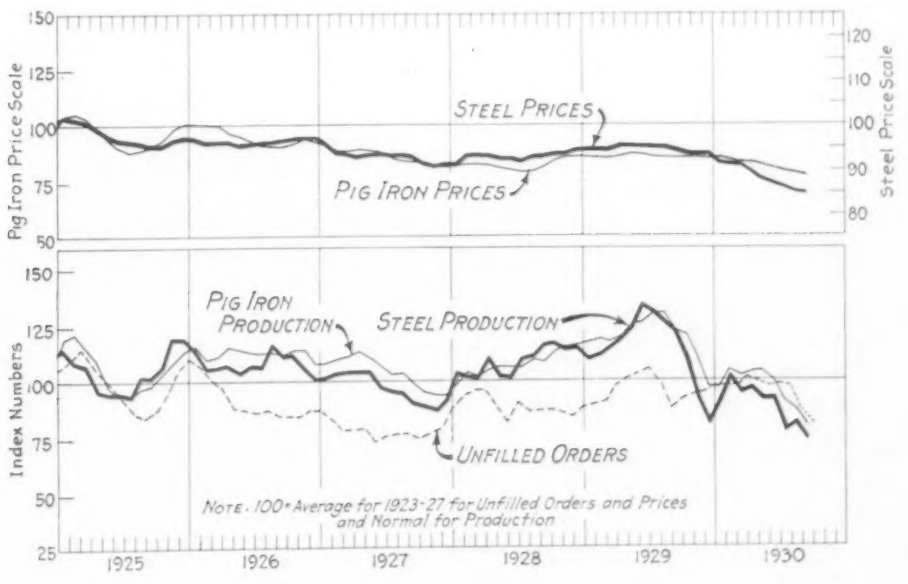
Naturally, with enforced curtailment of steel production and with declining unfilled orders, finished steel prices have declined. THE IRON AGE average for September was 2.147c., only 85.1 per cent of the average for the years 1923-1927, and a new low monthly average for the current recession.

We must consider the general level of prices, for obviously something is going on which affects the purchasing power of the dollar. Regardless of past levels or of costs of production, the general level of commodity prices continues to decline. Throughout the world, prices are seeking a level at which goods will move, and supply and demand will become equalized. Probably steel prices must go along with the general trend.

Pig iron production continues to recede, contrary to the usual seasonal trend. Our adjusted index for September is 79.6 per cent of normal, against 87 in August. This is the lowest annual rate since September, 1924. Clearly, production 20 per cent below normal requirements must eventually turn upward, but for the present we have to remember that, (1) pig iron production is not so far below normal as has been required in past periods of cyclical readjustment (it fell to 63.5 per cent in 1924 and to 31.4 in 1921); (2) pig iron production is still considerably above its average relationship with ingot output.

There is thus little reason to look for firmness in pig iron prices. The September average of $16.65 is only 77.8 per cent of the average for 1923-1927.

Finished steel prices, however, are 85.1 per cent of the same base period. Will THE IRON AGE composite fall to 2c., as it did early in 1922? Pig iron is cheaper than then, as is coke. Wire nails and sheets are considerably lower. So is the general level of commodity prices. It is true that scrap is now $1.50 higher than in early 1922, billets are $3 higher, and steel bars $4.70 higher. But the more fundamental comparisons suggest further weakness.



Steel production fell off more than seasonally. Pig iron output dropped, in place of the usual September rise.

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

(ESTABLISHED 1855)

Steel Tonnage Decline Natural

SINCE early March there has been a succession of disappointments as to steel tonnage, but steel has really behaved naturally enough in view of all the circumstances. The first disappointment came in March, which showed a lighter producing rate than February, whereas all precedents indicated that March or some later month should be the high month. The divergence appeared to be due to buyers early in the year appraising their prospects too highly, while the mills were certainly very assiduous in February in shipping as heavily as possible against orders available. There was no indication that something fresh had gone wrong, but rather an early underestimate of how far things had already gone wrong.

Another disappointment came when production fell so rapidly during the second quarter, June being 19 per cent under the peak rate of February, which is much more than the usual seasonal drop. Further disappointment came with July and the last disappointment has been the failure of seasonal increase to occur in September.

Nothing went wrong with steel as compared with trade generally. People did not quit buying steel to buy something else. There were two influences, more or less overlapping: First, that steel demand early in the year represented a partial survival of last year's activity, and second, that business in general was growing poorer.

That there has been progressive decrease in general trade activity is shown by the two most comprehensive indices, freight car loadings and bank debits. Allowing for seasonal fluctuations, both have been declining through the latest figures available. Thus it may well be held that while September steel production was a trifle under July there was such a decrease in the volume of business generally that steel really had something like its usual seasonal improvement, simply offset by the other influence.

Steel production in the year to date is not a measure of present conditions, and it is well now to consider the two halves of the year separately. A week ago, on the appearance of the monthly report of steel ingot production, we published our regular chart showing the trend line computed from production since the beginning of 1923. The trend line does not curve for seasonal variation within the year and indicates that normal or regular production this year should total about 53,500,000 tons. That would be under last year, but last year was an extra heavy year, rising above the general trend line.

Total production in the second half of the last seven years has been 9.3 per cent under first half, which is more than ordinary seasonal decrease, as the second half showing was pulled down by declines in 1923 and 1929 throughout the second half and by a uniformly poor second half in 1927 when the first half had been almost uniformly good. In an ordinary or typical year, not subject to extraneous influences, the decrease from first to second half would be nearer 5 per cent.

For the first half of this year production of Bessemer and open-hearth ingots was reported at 23,793,199 tons, which means a little over 24,000,000 tons with an allowance for electric and crucible ingots. This was equal to 1926 and 1927 and not a great deal under 1928 and 1929. The third quarter, however, has run only 9,000,000 tons and the fourth quarter promises to be less, so that 17,500,000 tons may be taken as a convenient figure for the second half. That was exceeded many years ago, whereas the first half represented a setback of only three years. The decrease from first half to second half by the assumption made is 27 per cent, but the second-half tonnage is not poor relative to general conditions.

Prices and Progress

THE long-range and short-range trends in prices are totally different as to their indication whether or not we are getting along well. Practically all economists regard price declines as an unfavorable augury for the nearby future of trade except in the case of a commodity which for one reason or another has been plainly too high, whereby its consumption has been restricted.

On the other hand, a long-range decline in the price of a commodity is a favorable factor. Presumably the producers do not suffer severely, as in the course of time the unfit are eliminated and the surviving fit make profits. The public is benefited by getting the thing cheaper, and other producers are benefited by the public having more money to spend on their wares.

Prices are to a large extent a concrete measure of progress. In 1859, the worst year in the depression of that time, No. 1 anthracite foundry pig iron at Philadelphia averaged $23.37, while in 1886, a very active and satisfactory year, it averaged $18.71. Producers and consumers were alike very much better off in 1886 than in 1859. Much progress had been made in the production of pig iron.

Occasionally this year there has been talk about the chances of a "return to pre-war prices," the connotation being that this would be a bad thing but people would have to put up with it and make adjustments in their own affairs to correspond. Over so long a period of time mere prices are no criterion as to activity or prosperity. If the idea is faultily expressed, and really implies a return to pre-war conditions, then it would mean a shocking downfall as to

manufacturing methods, but, according to the common view, a relaxation in the intensity of competition. Sellers may be wrong, but they certainly think they have had much keener competition in recent years than before the war.

Every article has been following its own price course since 1913 and, in general, they have got far away from their relationships to each other, while the majority have a different relationship to the general average. A summary indicating divergences follows:

Current Prices Relative to 1913 Averages

	Per Cent Change
All commodities at wholesale	+ 27
Farm products	+ 21
Foods	+ 33
Building materials	+ 52
House furnishings	+ 55
Pig iron	+ 12
Finished steel products	+ 29
Pig tin	— 34
Copper	— 33
Zinc	— 24
Lead	+ 26

There is no coherence in these figures and one should not expect coherence. Conditions have changed. Methods of producing copper have been greatly improved and the decline in price is more or less a measure of that fact. Building materials and house furnishings are at the other extreme, being high relative to the general average. Evidently they have made less progress than other things and perhaps a study would develop substantial grounds for criticism.

It is a good thing for prices to come down if they do so gently and by reduction in costs leave the producer as well off. When they go up, relative to other things, people as a mass revise their budgets. They are more likely than in 1913 to buy automobiles and less likely to build houses, but when they do build houses they will put more copper pipes in them.

High Wages and Three-Day Weeks

SIR WILLIAM JOWITT, attorney-general of Great Britain and a distinguished member of the present Labor Government of that country, who has been visiting the United States, is quoted as having expressed the opinion that men all over the world will eventually work but three days a week, but will be paid high wages in order that they may consume the goods they produce.

This is nothing more than a rather extravagant expression of opinion that is being entertained and expressed not only by members of labor governments and labor leaders, but also by a good many captains of industry. It is not entertained by any educated economists, for it flies in the face of all the teachings of economics. Let us see what this belief implies:

1. A reservoir of wealth out of which wages can be paid.
2. An exchange only of goods and previously accumulated wealth.
3. A perpetual surplus of goods.

These conclusions are, of course, contradictory. If there were a perpetual surplus of goods they would be benignly showered upon the people as in the tropics and there would be no need for a reservoir of wealth, other than what nature offers, and no need for wages. Under such conditions, however, population multiplies and produces a less happy situation unless it be checked by pestilence, warfare or other controls. The teeming millions of India and China are more concerned in respect to a sufficiency of production than they are in respect to wages.

In countries of higher civilization there are occurrences of the excessive production of some things, never more than temporary, and the release of workers by the processes of correction or of improvement in the arts. In 1929 there was distinctly such an overproduction of automobiles. In 1930 the manufacture of automobiles was reduced to substantially a three-day per week basis. There are still a good many Americans who do not possess automobiles and if they were granted higher wages they might be able to acquire them. But whence would come the higher wages and how would the automobile makers be able to meet the requirements if they worked only three days a week?

The belief in high wages and short time is like the conception of the inhabitants of an island who got their living by doing each other's washing; or like the economics of the proposed cat-rat ranch of the columnists. If this fallacious hypothesis had been put into effect 100 years ago we should not have had any railroads, or steamships, or electric lights, or automobiles or any of the conveniences and comforts of modern civilization. If it were made effective now it would be equivalent to the assumption that we are satisfied with the stage of living that we have reached and do not want any more new things, and consequently the only job is to make a more equal distribution of what we have, which trends toward a haphazard communism.

High wages that are not earned and the British system of doles are economic first cousins and both of them lead to three-day weeks, or perhaps no days at all, and to economic retrogression.

Steady Efforts to Sell

CONTINUED steady effort to sell goods is the prime need of the hour. It is the most effective way to be taken to change the state of mind that prolongs a business recession. The suggestion is almost the converse of a "buy now" movement, such as is again being noisily proposed in some quarters. Futile in other dragging periods, indiscriminate and feeble buying will prove so now.

Consumers in the majority are reaching the end of a period of voluntary restriction of purchases. They are wearing out the impulse to unaccustomed thrift. They are accumulating many wants. The opportunity now is to stimulate the desires of that reduced number of buyers in a position to fill their own requirements. As the climb upward toward better times proceeds, it will be characterized, like previous revivals, by increased consumer buying. Once the curve is on the rise, every successful effort to increase sales of standard goods will contribute to the cumulative effect and swell the volume of trade. Resumption of the normal trend of national productive capacity will come only as the result of the combined efforts of every producer to hold and increase his trade.

Large Scale Output of Wrought Iron

(*Concluded from page* 1080*D*)

shoves the bloom on to the rollers of the blooming mill approach table.

The entire process required engineering of a pioneering nature as there was no precedent to follow except the engineering work done at the Warren plant. The reduction of the bloom into the finished products is, however, according to practice familiar to rolling mill engineers.

Blooming and Finishing Mills

The 40-in. blooming mill, which is of the most modern type, is driven by a 5000-hp. motor and will reduce the iron blooms into either slabs or billets. From the mill the slabs or billets pass to an electrically driven shear, which cuts them into the lengths desired. For the storage of the slabs and billets a building 429 x 100 ft. has been provided, and in an adjacent parallel building are located the heating furnaces to serve the finishing mills.

The universal plate mill produces plates from 12 to 84 in. wide, skelp for the manufacture of pipe and forging blooms or billets. Two furnaces are now in service for heating the blooms that are fed to the mill. It is electrically operated. The slabs or plates pass from the mill to a hot bed and from this to shearing tables where the sides or ends, or both, can be cut.

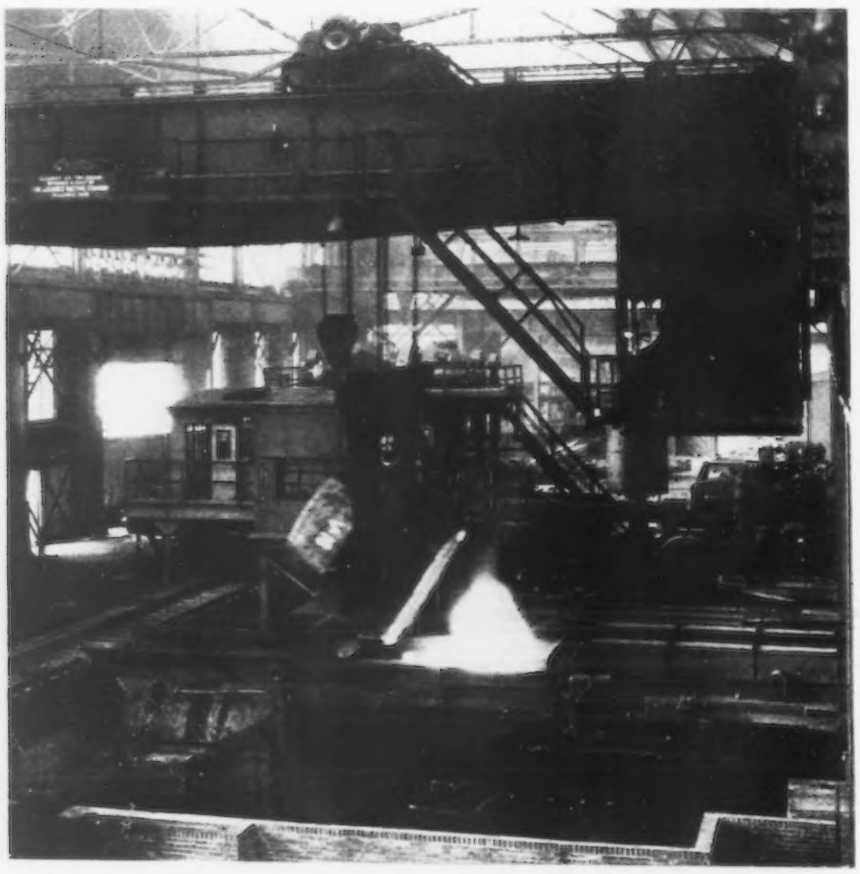
Parallel to the plate mill but in another building is the 20-18-16-in. skelp mill for rolling skelp for the manufacture of pipe in smaller sizes. The mill is of the continuous type, consisting of five stands of edging or vertical rolls and nine stands of horizontal rolls. The edging rolls exert a pressure against the sides of the plate, eliminating the necessity of side shearing. A hot bed 160 ft. long receives the skelp from the run-out table.

In a third parallel building is a mill for rolling merchant mill products, such as rounds, flats, squares and other sections. Billets to be rolled in this mill are heated in two furnaces of a design similar to those that heat slabs for the universal and skelp mill. The billet passes through one stand of roughing rolls and then through five stands of finishing rolls, all electrically driven. The product may go through a rotary flying shear to a 110-ft. hot bed or to two reels. Two roller tables carry the bars to vertical shears.

All three of these mills deliver their products into the building from which they are shipped, a structure 472 ft. long with a width between crane runways of 125 ft.

The Byers process for making wrought iron, which was described in detail in THE IRON AGE of Aug. 8, 1929, page 341, in a paper by Dr. James Aston, the inventor, is analogous in principle to the hand-puddling process, but the manner of achieving the same objective is different. While the wrought iron produced by both methods is said to be practically identical, the new process makes possible, it is asserted, a closer metallurgical and chemical control without quantity limitations or exhaustive and arduous labor.

In the key or processing operation described above, as the molten iron falls through the liquid slag it solidifies into a granular form and, as in the puddling furnace, each grain takes on a coating of slag. As the stream of iron strikes the surface of the slag, it breaks into minute globules in the interior of which a gas instantaneously collects. While these globules are descending, the gas pressure within them increases to a point where the hollow globules are completely shattered. This phenomenon, the bursting of the shells of the globules, permits the particles of metal to receive a complete coating of slag, and thus the action, which in the puddling process gives wrought iron its peculiar merit, is carried out to even a greater degree in the Byers process, it is stated.



After iron has been mixed with slag and is in viscous form, it is deposited in a 900-ton press, which produces the bloom

Sheet-Metal Ware Shipments Up in August

WASHINGTON, Oct. 10.—Shipments of enameled sheet-metal ware in August were 309,645 doz., valued at $1,230,697, compared with 213,420 doz., valued at $858,774, in July, and 385,162 doz., valued at $1,371,354, in August of last year, according to reports received by the Department of Commerce from 16 manufacturers, comprising approximately 80 per cent of the industry.

August shipments of galvanized sheet-metal ware were reported as 147,181 doz., valued at $566,242, against 137,970 doz., valued at $523,970, in July, and 163,321 doz., valued at $673,665, in August, 1929.

Palmer-Bee Co., Detroit, manufacturer of conveyors, speed reducers, flexible couplings, fabricated steel, coal and ash handling equipment and power transmission equipment, has opened five new sales offices, as follows: Buffalo, Ellicott Square Building, C. E. Jeremias, manager; Pittsburgh, Farmers' Bank Building, C. E. Musselman, manager; Cleveland, Rockefeller Building, F. B. Barkwill, manager; Winston-Salem, N. C., Reynolds Building, E. S. Davidson, manager; Philadelphia, Bulletin Building, S. T. Transeau, manager.

Conservatism of Buyers Becomes More Pronounced

▲ ▲ ▲

SPECIFICATIONS Recede Further—Rail Orders an Offsetting Influence — Price Declines in Pig Iron and Scrap

▼ ▼ ▼

IRON and steel specifications have declined as caution has become more pronounced among buyers. With continued reaction in the grain and securities markets and renewed weakness in prices of scrap, pig iron and finished steel, the betterment in sentiment which accompanied the short-lived mid-September rise in demand has given way to a fresh wave of extreme conservatism.

Interest in forward buying has subsided and consumers are again sharply reducing inventories. While this curtailment has been so severe that producers believe it is being overdone, steel releases remain numerous, if not individually large, and the decline in the total volume of shipping orders has not been marked. Steel plant operations, at 55 per cent, compare with 58 per cent a week ago, but, according to present indications, will not change materially over the rest of this month.

Tin mill operations, although entering a period of seasonal decline, are holding at 60 per cent. Tin plate business for the year will fall less than 10 per cent behind that of 1929. Line pipe output, which has been heavy since the first of the year, is tapering and producers are making an effort to extend their present tonnage over as long a period as possible. Several contemplated pipe lines are now thought likely to be held over until next year. The latest project to be planned is a 22-in. natural gas line from Kentucky to Detroit, to extend a distance of 400 miles. A Seattle water line, now up for bids, will require 10,000 tons of plates.

The unfavorable situation in the automobile industry, bad as it is, appears to have been exaggerated. September production fell only 3 per cent below that of August and it is probable that output this month will show little further recession. With a seasonal falling off likely in November and December, particularly in the last two weeks of the year, total American and Canadian production of cars and trucks for 1930 is now estimated at 3,500,000 to 3,600,000 units.

Construction work, judging by recent large additions to the list of pending structural steel projects, shows no signs of falling off. New inquiries total 43,000 tons, compared with 49,000 tons a week ago. Since Sept. 1 they have averaged 39,000 tons. Awards, at 28,500 tons, compare with 30,500 tons last week.

Rail orders for the week total 38,000 tons, including 12,000 tons placed by a Southern road, 10,000 tons purchased by the Great Northern and 8000 tons each awarded by the Kansas City Southern and the Northern Pacific. In addition, 25,000 tons of track accessories was booked by Chicago mills.

The tonnage of rails placed this fall to date totals only 225,000 tons compared with 350,000 tons in the comparable period last year. However, rail purchases, even if smaller than usual, are coming at a time when demand from other sources is diminishing and will prove at least a partial offset. Chicago rail mill schedules, now on a 25 per cent basis, will be raised to 50 per cent by the end of the month.

The Union Pacific is inquiring for 18,000 tons of rails, the Canadian National, 1100 tons for its United States lines, and the Rock Island, several thousand tons for a new line in the Southwest.

Price developments are unfavorable. Heavy melting scrap is off 50c. a ton at Philadelphia, Chicago and Cincinnati and 25c. off at St. Louis and Cleveland. While no further reduction is reported at Pittsburgh, only substantial mill purchases in the next few days will maintain present prices.

Foundry pig iron has declined 50c. a ton at Pittsburgh and in the Valleys and has been marked down $1 a ton at Buffalo for local delivery. Inter-district competition has become more severe, and prices at Lake Erie furnaces for distant shipment have receded 50c. a ton to $16. Considerable inquiry for forward delivery is still before the trade, but actual contracting has been limited in the absence of signs of price stability.

Among finished steel products, black sheets have declined another dollar a ton and vitreous enameled sheets have been reduced $2 a ton. Irregularities on blue annealed sheets and light plates are more numerous.

Spot Straits tin, in declining to 24.62½c., New York, reached the lowest level since 1902. Zinc has receded further to 4c., East St. Louis, and lead has been marked down to 4.95c., St. Louis.

All three of THE IRON AGE composite prices have receded to new lows for the year. Finished steel has declined from 2.142c. to 2.135c. a lb.; pig iron from $16.38 to $16.29 a gross ton; scrap from $13.25 to $12.92 a gross ton. The scrap composite is the lowest since early in 1922.

PITTSBURGH — Steel Business Falling Behind September Rate —Foundry Iron Off 50c. a Ton

PITTSBURGH, Oct. 14.—The first half of October has hardly justified the expectations of local steel producers, who had based hopes for improvement on the interest displayed by consumers during September. With the exception of a few smaller companies, and specific departments of the larger steel makers, tonnage releases this month are falling behind the September average.

In spite of the disappointing aggregate releases, the character of current specifications is such that most of the larger companies believe that curtailment of consumption will not be continued much longer. The largest loss of tonnage is accounted for by the heavier consumers, who now seem to have pared down their requirements to a minimum rate. On the other hand, miscellaneous demand from smaller users is holding up, and specifications are very numerous, if not in heavy volume.

One large company finds work in its order department considerably heavier than usual, even in times of good demand. Finishing mill schedules are feeling the effects of reduced tonnage, and curtailment is in evidence here and there throughout the district.

While this is not yet felt to any marked extent in open-hearth departments, the operating rate in the Pittsburgh district is lower than it was at the beginning of the month, and is estimated at slightly less than 55 per cent of theoretical capacity. The smaller independents have been able to hold their own fairly well, with operations ranging from 35 to 50 per cent, while the larger interests are reported to be cutting down their production of raw steel slightly.

Prospective demand for structural steel, coming almost entirely from public projects, is one of the bright features of the market, as a considerably larger tonnage than usual is in prospect in the immediate district. An Ohio River bridge in Pittsburgh will take 6600 tons, and a building for the Federal Reserve Bank 1000 tons. Other projects reported previously are expected to be closed in the near future, and activity in the smaller fabricating plants is at a higher rate than was the case during the summer. The larger interests are also well occupied. An order for eight steel barges, requiring 2000 tons of plates, has been placed by the Gulf Refining Co. with the Riter-Conley division, McClintic-Marshall Co., and other barge business is in prospect.

Price changes during the week have been negligible, and the market is still largely quoted at nominal figures or at a range of $1 to $2 a ton. Vitreous enameling stock has declined $2 a ton to 3.70c., Pittsburgh. The larger mills are still trying to maintain the bar market at 1.65c. In the meantime, plates and shapes seem to be holding somewhat better than was the case a few weeks ago.

Steel business dropping below the September rate, and outlook for improvement is uncertain.

* * *

Ingot operating rate goes below 55 per cent, the average which has been maintained for several weeks.

* * *

Meeting competition from Cleveland and Buffalo furnaces, foundry pig iron is 50c. a ton lower in Valleys and at Pittsburgh.

* * *

Scrap prices unchanged, but maintenance of present levels depends on expected buying of heavy melting steel this week.

The pig iron market continues very dull. With prices rather seriously muddled, Pittsburgh and Valley furnaces are meeting competition from both the Buffalo and Cleveland markets, and foundry iron at Pittsburgh and the Valleys is lower. Scrap is very dull, and only substantial mill purchases in the next few days will maintain quotations at present levels.

Pig Iron

Despite the fact that business shows practically no improvement, the market has developed some activity from a price standpoint, and present quotations are being questioned even on small tonnages. On a recent inquiry for No. 2X iron, quotations are reported to have been made by both local and Cleveland furnaces that figured back to nearly $1 under the recent asking prices. Another consumer has bought a small tonnage of foundry iron on a basis of $17, Valley, and this grade is now quotable at a range of $17 to $17.50, Valley furnace. On the other hand, sales of malleable and Bessemer iron have been made at $18, Valley, and these figures still seem to represent the market in spite of the fact that they are out of line with the usual relationship between the various grades of iron in this district.

One seller reports slightly heavier shipments this month than during September, but the improvement does not seem to be general.

The Adrian furnace at Du Bois, Pa., is soon to be blown out, leaving no strictly merchant furnaces operating in the Valleys or western Pennsylvania.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	$17.00 to 17.50
No. 3 foundry	16.50 to 17.00
Malleable	18.00
Low phos., copper free	26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$17.50
No. 2 foundry	$17.50 to 18.00
No. 3 foundry	17.00 to 17.50
Malleable	18.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel

The market is very quiet, with virtually no open transactions to report. Shipments against old contracts are continuing on the basis of $31, Pittsburgh or Cleveland, for billets, slabs and sheet bars, although this figure is strictly nominal when applied to current business. Forging billets are unchanged at $36, Pittsburgh, with the same figure applying to wire rods. Rods are moving as well this month as they did in September, with shipments fairly heavy to users with diversified outlets.

Rails and Track Accessories

Pittsburgh mills are not yet benefitting by rail orders, which thus far have gone principally to Chicago district producers. The larger Eastern roads are said to be preparing their inquiries, and reports of rather sharp declines as compared with last year are heard. Most of the carriers have closed against their routine quarterly contracts for track accessories and other steel products, and specifications are reaching local mills in fair volume.

Bars, Plates and Shapes

Specifications so far in October have not been in sufficient volume to maintain mill operations at the September rate, but downward adjustments have not been general. Bar mills are employed at the lowest rate of the heavy hot-rolled producing capacity, and the average rate of the Pittsburgh and Valley districts on carbon steel bars is not above 45 per cent. On alloy tonnage the figure is even lower. On plates and shapes, tonnage releases are heavier in the aggregate, although a few large projects are largely responsible for maintained production. Bidders on six steel barges for the Gulf Refining Co. are reported to be revising their estimates and no award has been announced. The United States Engineer at Memphis, Tenn., has placed three dredging barges with Pittsburgh

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Oct. 14, 1930	Oct. 7, 1930	Sept. 16, 1930	Oct. 15, 1929
No. 2 fdy., Philadelphia	$18.76	$18.76	$19.76	$21.26
No. 2, Valley furnace	*17.00*	17.50	18.00	18.50
No. 2 Southern, Cin'ti	15.19	15.19	15.69	17.19
No. 2, Birmingham	14.00	14.00	14.00	14.50
No. 2 foundry, Chicago*	17.50	17.50	17.50	20.00
Basic, del'd eastern Pa.	17.75	17.75	18.75	19.75
Basic, Valley furnace	17.00	17.00	18.00	18.50
Valley Bessemer, del'd P'gh	19.76	19.76	20.26	20.76
Malleable, Chicago*	17.50	17.50	17.50	20.00
Malleable, Valley	18.00	18.00	18.50	19.00
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	94.00	94.00	94.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	31.00	31.00	31.00	35.00
Sheet bars, Pittsburgh	31.00	31.00	31.00	35.00
Slabs, Pittsburgh	31.00	31.00	31.00	35.00
Forging billets, Pittsburgh	36.00	36.00	36.00	40.00
Wire rods, Pittsburgh	36.00	36.00	36.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.70	1.85
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.60	1.60	1.60	1.90
Bars, Chicago	1.70	1.70	1.70	2.05
Bars, Cleveland	1.65	1.65	1.65	1.95
Bars, New York	1.93	1.93	1.93	2.24
Tank plates, Pittsburgh	1.60	1.60	1.60	1.95
Tank plates, Chicago	1.70	1.70	1.70	2.05
Tank plates, New York	1.88	1.88	1.88	2.22½
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.90
Structural shapes, Chicago	1.70	1.70	1.70	2.05
Structural shapes, New York	1.85½	1.85½	1.80½	2.14½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh	1.60	1.60	1.65	1.90
Cold-rolled strips, Pittsburgh	2.35	2.35	2.35	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel, *Per Lb. to Large Buyers:*	Oct. 14, 1930 Cents	Oct. 7, 1930 Cents	Sept. 16, 1930 Cents	Oct. 15, 1929 Cents
Sheets, black, No. 24, P'gh	*2.35*	2.40	2.40	2.75
Sheets, black, No. 24, Chicago dist. mill	2.55	2.55	2.50	2.95
Sheets, galv., No. 24, P'gh	3.00	3.00	3.00	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.10	3.10	3.10	3.60
Sheets, blue, No. 13, P'gh	2.05	2.05	2.05	2.35
Sheets, blue, No. 13, Chicago dist. mill	2.25	2.25	2.25	2.45
Wire nails, Pittsburgh	2.00	2.00	2.00	2.45
Wire nails, Chicago dist. mill	*2.05*	2.10	2.10	2.45
Plain wire, Pittsburgh	2.30	2.30	2.30	2.40
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.40
Barbed wire, galv., Pittsburgh	2.70	2.70	2.70	3.10
Barbed wire, galv., Chicago dist. mill	2.85	2.85	2.85	3.15
Tin plate, 100-lb. box, P'gh	$5.00	$5.00	$5.25	$5.35
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$14.75	$14.75	$15.75	$17.25
Heavy melting steel, Phila	*12.50*	13.00	13.00	15.50
Heavy melting steel, Ch'go	*11.50*	12.00	12.50	14.25
Carwheels, Chicago	13.50	13.50	13.50	14.00
Carwheels, Philadelphia	15.00	15.00	15.00	16.50
No. 1 cast, Pittsburgh	13.25	13.25	13.50	15.50
No. 1 cast, Philadelphia	13.00	13.00	13.00	16.00
No. 1 cast, Ch'go (net ton)	11.00	11.00	11.50	14.50
No. 1 RR. wrot., Phila.	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net)	9.25	9.25	10.00	14.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$2.65
Foundry coke, prompt	3.50	3.50	3.50	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	10.12½	10.12½	10.87½	18.12½
Electrolytic copper, refinery	9.75	9.75	10.25	17.75
Tin (Straits), New York	24.62½	27.37½	29.87½	42.25
Zinc, East St. Louis	*4.00*	4.20	4.25	6.80
Zinc, New York	*4.35*	4.55	4.60	7.15
Lead, St. Louis	*4.95*	5.10	5.35	6.70
Lead, New York	*5.10*	5.25	5.50	6.90
Antimony (Asiatic), N. Y.	*7.25*	7.50	7.75	8.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

yards. Otherwise, the barge business is quiet, but several inquiries are said to be in prospect. Fabricators of steel tanks are taking a fair tonnage of plates, but demand from railroad car builders has tapered to the lowest point this year.

The structural market is featured by rather heavy inquiries on public work projects, with an almost total lack of private enterprises. Bids will be taken Oct. 28 on the superstructure of the West End-North Side bridge in Pittsburgh, requiring 6600 tons of shapes. The substructure of another Pittsburgh bridge will take 400 tons. The Pittsburgh branch of the Federal Reserve Bank, on which bids close Oct. 15, will require 1000 tons, and nearly 2000 tons is pending for State highway work in this vicinity, on which general contractors have not yet taken action. Two schools in the Pittsburgh district will also take about 900 tons.

Prices on plates and shapes are holding fairly well at 1.60c., Pittsburgh, and talk of shading is not nearly so common as was the case six weeks ago. Local mills are still quoting 1.65c. on bars, but sufficient business is going at 1.60c. to make a range necessary for proper market representation.

Tubular Goods

No sizable orders for line pipe have been reported recently, and the market on other forms of tubular goods is dull. Line pipe projects mentioned during the summer as pending are now likely to be held over until spring before letting, and in most cases mills are making efforts to extend their present tonnage over as long a period as possible. Seamless and electric-weld units are running at 60 to 70 per cent of capacity, while operations among other mills average down to about 35 per cent. Mechanical tubing is very dull, and only slight activity is reported in boiler tubes.

Wire Products

Shipments of wire products so far this month have been comparable with the corresponding September period and slightly ahead of the midsummer average. Specifications were light last week, probably because consumers ordered out more material than usual at the beginning of the quarter to build up depleted inventories.

Prices show no particular change in this district, with $2 a keg applying to most users of nails, and 2.30c. a lb., Pittsburgh, representing the market on bright hard wire. If concessions are being made, they represent only the usual differentials enjoyed by very considerable buyers.

Cold-Finished Bars

Specifications this month are not up to the September level. Mill operations have declined to 35 or 40 per cent of capacity. Producers selling a large proportion of their product to the automobile industry are rather hard hit, and miscellaneous consumption is none too good, with such users as the agricultural implement makers very slow. Demand from jobbers is light, and distributers are complaining of direct mill competition on very small tonnages. The price is nominal, holding at 2.10c., Pittsburgh, although not tested by significant tonnage buying.

Sheets

Specifications for sheet steel have fallen below the September average and no longer justify an operating rate of more than 45 per cent for the industry as a whole. The leading interest ran its mills last week at about 48 per cent, while the corresponding

THE IRON AGE COMPOSITE PRICES

	Finished Steel	Pig Iron	Steel Scrap
Oct. 14, 1930	2.135c. a Lb.	$16.29 a Gross Ton	$12.92 a Gross Ton
One week ago	2.142c.	16.38	13.25
One month ago	2.142c.	16.88	13.75
One year ago	2.369c.	18.29	15.67
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1930	2.362c., Jan. 7	2.135c., Oct. 14	$18.21, Jan. 7	$16.29, Oct. 14	$15.00, Feb. 18	$12.92, Oct. 14
1929	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5

figures for various independent companies ranged from 50 down to complete suspension. In the latter cases, however, 50 per cent schedules or better will likely be maintained this week. Interest in forward buying is not so pronounced as it was last month, as many consumers are covered and others are able to buy at a favorable price in the open market. Prompt deliveries are nearly always urged as well as obtained.

Automobile companies are beginning to inquire for their November requirements, but early reports throw little light on their probable operating schedules. Farm implement makers are doing little, but a fair tonnage is coming from stove makers who are engaged in aggressive selling campaigns this season. Makers of metal trim for office and other large buildings are fairly active, but steel furniture makers have scaled down their production.

Prices show little official change. Vitreous enameling stock has been marked down $2 a ton to 3.70c., Pittsburgh. Tin mill black plate is no longer maintained at higher than 2.70c., Pittsburgh, but on other products a $2 a ton range is still necessary to represent the market fairly. This is particularly true on the common finishes of sheets, on which higher figures are still maintained by leading mills as the official prices in the face of widespread shading. Galvanized sheets, for instance, are selling at 3c., Pittsburgh, and often less, in some parts of the country, while in other districts the official price of 3.10c. is well maintained. Black sheets are quotable at 2.35c. to 2.45c., Pittsburgh, light plates at 2c., and blue annealed sheets at 2.15c. Lower figures generally apply to the continuous mill product.

Tin Plate

Possibly as a result of the announcement of the official price for the first half of 1931, tin plate specifications were fairly good last week for this season of the year and no further curtailment in mill operations is reported. The average rate for the industry is estimated at about 60 per cent of capacity, with the leading interest still maintaining a somewhat higher figure.

Strip Steel

While tonnage releases this month average somewhat less than those of September, a few companies have held their own and comparisons are favorable, at least with the early part of the previous month. Little tonnage is coming from the automobile industry, but other sources of demand are holding up rather well even if at a restricted rate. Orders are characteristically small, but rather numerous, and strip makers are able to maintain an operating rate of 35 to 40 per cent.

Prices on hot-rolled material are well maintained at 1.60c., Pittsburgh, on the wider sizes and 1.70c. on the narrow. The general market on cold-rolled is now 2.35c., although small lots occasionally bring $1 to $2 more.

Coal and Coke

The coke business continues decidedly dull, and warm weather is reducing the movement of domestic grades. Production of furnace coke is considered in line with consumption, and the price has held at $2.60, Connellsville, with a few sellers seeking $2.65. Foundry coke is dull, with shipments this month holding at about the same rate as in September. A fair demand for domestic coal is reported from some districts, but dealers are loaded with slack, which is being disposed of at distress prices.

Old Material

The scrap market has been exceedingly dull in the last week and prices are nominally quoted at the same figures. No test has been offered by mill buying and dealers are making rather light purchases, as most of them have very few shipping orders at this time. Most of the sales of heavy melting steel a month or six weeks ago have been covered, and in some cases some material is on track as a result of overshipments. The trend of the market in the next week depends upon mill buying, and the prospective purchases of one consumer in particular, which dealers believe may do some substantial buying.

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.75c.
Reinforcing steel bars	2.75c.
Cold finished and screw stock—	
Rounds and hexagons	3.35c.
Squares and flats	3.85c.
Bands	3.10c.
Hoops	4.10c.
Black sheets (No. 24), 25 or more bundles	3.25c.
Galv. sheets (No. 24), 25 or more bundles	3.85c.
Light plates, blue annealed (No. 10), 1 to 24 plates	2.50c.
Blue annealed sheets (No. 13)	2.65c.
Galv. corrug. sheets (No. 28), per square	4.25c.
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 and 10 per cent off list
Machine bolts, 100 count,	60 and 10 per cent off list
Carriage bolts, 100 count,	60 and 10 per cent off list
Nuts, all styles, 100 count,	60 and 10 per cent off list
Large rivets, base per 100 lb.	$3.30
Wire, black, soft ann'l'd, base per 100 lb.	$2.60 to 2.70
Wire, galv. soft, base per 100 lb.	3.20 to 3.30
Common wire nails, per keg	2.35
Cement coated nails, per keg	2.65 to 2.80

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	12.00 to 12.50
Scrap rails	14.25 to 14.75
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	13.50 to 14.00
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	10.50 to 11.00
No. 2 railroad wrought	14.50 to 15.00
Hvy. steel axle turnings	12.00 to 12.50
Machine shop turnings	7.00 to 7.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	17.00 to 17.50
Railr. coil and leaf springs	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	19.00 to 20.00
Low phos. mill plates	16.50 to 17.00
Low phos. light grades	16.50 to 17.00
Low phos. sheet bar crops	17.00 to 18.00
Heavy steel axle turnings	12.00 to 12.50
Electric Furnace Grades:	
Low phos. punchings	16.50 to 17.00
Heavy steel axle turnings	12.00 to 12.50
Blast Furnace Grades:	
Short shoveling steel turnings	8.00 to 8.50
Short mixed borings and turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Rolling Mill Grades:	
Steel car axles	20.50 to 21.00
Cupola Grades:	
No. 1 cast	13.00 to 13.50
Rails 3 ft. and under	16.00 to 16.50

CHICAGO

Orders for Rails and Track Supplies Total 50,000 Tons—Ingot Output Off

CHICAGO, Oct. 14.—Steel sales, bolstered by about 50,000 tons of rails and track accessories, show a moderate increase for the week. The plate and shape markets continue to lag, but new demand for bars shows slight growth. Forward buying in finished steel continues to drag, the bulk of current orders being for nearby shipment and for customers' estimates of immediate requirements.

Shipments of steel, influenced by a shrinkage in plate tonnage, are lower than a week ago, and ingot output is off two points to an average of 55 per cent for the district as a whole.

Significance may be attached to the fact that rail orders are running lighter than a year ago. However, there are instances where 1931 budgets call for more rails than were planned for the current year.

The situation does not seem so discouraging when it is recalled that not all of last year's contracts were specified in full and that some tonnages ordered from mills this year have not been put in track. After only recently having decided to postpone construction, the Rock Island is now actively seeking several thousand tons of rails for a new line in the Southwest. The Union Pacific is inquiring for 18,000 tons.

Railroads enter orders for 26,000 tons of rails and 25,000 tons of track supplies, but individual rail orders are smaller than those of a year ago.

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Ingot production rates decline two points to an average of 55 per cent for district.

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Plate market affected by declining specifications for line pipe manufacture, but tank tonnage is more promising.

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Diversity of new orders for bars indicates some spread of manufacturing activity.

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Scrap market weak, with decline to 50c. a ton on heavy melting following one of like amount a week ago.

Pig Iron

The rather steady, though slow, gain in melt over the past three weeks has come to a halt, as gaged by shipments of Northern foundry iron. New buying also is less active, and it becomes apparent that the tonnages to be purchased during the remainder of this year will be spotty in character. A few melters continue to watch the price situation and to enter inquiries for the first quarter of the new year. Small resale offerings at Milwaukee and price changes in nearby territories do not appear to have shaken the local quotation, which stands at $17.50 a ton, local furnaces.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil.	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	27.04
S'th'n No. 2 fdy	17.51
Low phos., sil. 1 to 2 copper free	$28.50 to 29.20
Silvery, sil. 8 per cent	26.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys

With shipments limited because of slack mill and industrial output, this market is on the verge of being at a standstill. There is some speculation as to when 1931 contracts will be offered and as to what stand producers will take on prices.

Plates

So far as tank tonnage is concerned, this market has rebounded from the unfavorable outlook of a week ago, when announcement came that 20,000 tons of tankage had been removed from the market because regulation of output of crude oil would remain in effect in Oklahoma. A refiner in the Southwest has placed an order for tanks, which will take 3000 tons, and similar projects, either now in the market or far enough advanced so that they will soon become actual inquiries, call for another 8000 to 10,000 tons of plates. Although this situation is encouraging, it cannot be overlooked that unfavorable developments are occurring in the pipe line market. Either pipe cannot be laid as fast as it has been produced in recent weeks, or there have been suspensions of orders, or old orders are well worked off and new ones are not to be had at this time. In any event, shipments of plates for pipe manufacture are in lighter volume than a week ago, and plate mill schedules are feeling the effects of lack of tonnage from this source, which has been a real boon in this period of curtailed steel consumption. Word comes that the Northern Gas Co. has applied for permission to extend a 22-in. natural gas line from the Kentucky fields to Detroit. This line would be about 400 miles long.

Close to 6000 tons of steel will be required for 500 50-ton steel box cars ordered this week by the Chicago Great Western. Miscellaneous use of plates remains spotty and in small aggregate tonnage.

Bolts, Nuts and Rivets

Specifications for these commodities remain close to the level of a week ago. The farm implement group is making close studies of probable winter manufacturing schedules.

Reinforcing Bars

Some encouragement is offered dealers in reinforcing bars by the fact that new projects up for estimating are showing a substantial increase. Current business, however, is very quiet. Some work which appeared certain of going ahead last week is now shelved for the time being. Plans are being revised for the International House at the University of Chicago, and the tonnage needed for the Eddystone apartments may not come out for some time. Various road contractors are placing small tonnages from day to day, it evidently being their thought that programs cannot be planned very far in advance at this time of the year. Prices for reinforcing bars out of Chicago warehouses lack strength.

Structural Material

This week's news in the structural market is more or less a repetition of events in any one of the last five or six weeks. Occasionally a large inquiry makes its appearance, but on the whole current contracts are small and all of them are subject to the extreme competition which has been characteristic of this market for many months.

About 2300 tons will be needed for the Electrical Building for the World's Fair. Construction is under way on the Randolph Street viaduct, Chicago. The substructure calls for 700 tons of steel and the superstructure will take about 1100 tons. Chicago and Cook County voters will be called on in November to decide on a number of bond issues for public improvements. Among these is $3,500,000 for reconstruction of the State Street bridge, which will be a preliminary step in the construction of a subway.

Bars

Use of bars is holding at the gains made in recent weeks. Diversity of new orders, which usually are for immediate shipment, indicates a gradual spread in activity. Farm implement manufacturers are still studying the possibilities of starting in November to manufacture equipment which must

be ready for shipment in the spring. The price for mild steel bars is steady at 1.70c. a lb., Chicago.

Output of alloy steel bars is unchanged at 40 per cent of capacity. Demand, though still at close range, is slowly spreading to take in more users who have not been in the market for some time. Several sellers of medium-priced automobiles report increased registration in the Chicago and other areas. This situation is reflected in a small way in steel releases made this week by several automobile manufacturers. Specifications and new business in rail steel bars are running about even with the rate in September. The price is steady at 1.65c. a lb., Chicago district mill.

Wire Products

Although October business shows some gain over the volume in the final two weeks of September, the upturn has not been so marked as sellers had expected, and there is rather keen disappointment that this, usually one of the best months in the year, will not make a better showing. Demand for woven wire fencing is unusually light, a situation which it is said is traceable to the levels of prices for farm products. The building industry, in particular residential construction, is quiet and there is a resultant lack of demand for wire nails.

Reports from jobbers indicate that distribution is spotty and also variable over short periods of time. The use of wire by the manufacturing trade remains quite steady, though the aggregate volume is not in keeping with usual expectations at this time of year. Use by automobile manufacturers has grown slightly since the turn of the month. Wire mills are producing at 45 to 50 per cent of capacity.

Cold-Rolled Strip

Demand is steady, output remaining at 30 per cent of capacity. Prices are 2.35c. a lb., Cleveland, or 2.63c., delivered Chicago.

Rails and Track Supplies

Orders placed in the week aggregate 26,000 tons of standard-section rails and 25,000 tons of track accessories. The track supplies ordered are for rails that had been purchased prior to this week. The Kansas City Southern bought 8000 tons of rails from Inland, Illinois and Bethlehem. The Great Northern placed 10,000 tons, which does not include its requirements for an extension in the far West. This railroad awarded 4000 tons to Illinois, 4000 tons to Bethlehem and 2000 tons to Inland. The Northern Pacific has placed 8000 tons. The Union Pacific has come into the market for 18,000 tons.

Purchases of rails continue to run lighter than a year ago. The Great Northern is taking about one-third of its stated needs a year ago and the Northern Pacific is finding use for only about half of the rails ordered last year. The Kansas City Southern's tonnage is equal to that in the fall of 1929.

Orders placed for tie plates are disclosing prices that range downward to $39 a ton.

Rail mill operation, which now stands at 25 per cent of capacity, may be raised near to the 50 per cent mark about the end of this month, according to the plans of producers.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Cast Iron Pipe

Impetus gained by this commodity a week ago has not held, and some sellers are beginning to have doubts as to the ability of the market to carry though the fall even at the present level of activity. Chippewa Falls, Wis., has placed 170 tons with the Central Foundry Co. and several utilities have entered specifications against old contracts. Miscellaneous buyers, including the railroads, are finding little use for cast iron pipe.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $44 to $45; 4-in., $47 to $48; Class A and gas pipe, $3 extra.

Sheets

Hot mills in this district continue to operate in the range of 50 to 55 per cent of capacity on a run of business which is at extremely close range, but in rather uniform aggregate volume. Shipments during the first 10 days of October were practically double the tonnage moved in the corresponding days of September.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.60c.; No. 24 galv., 3.15c. to 3.25c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Coke

Shipments of by-product foundry coke continue to creep up slowly. The price remains steady at $8 a ton, f.o.b. local ovens.

Old Material

Buyers' pressure against the price structure has had telling effect in the form of lower prices on nearly all sales made during the week. Heavy melting steel is off 50c. a ton and malleable grades have receded a like amount. Railroads now are anxious to move accumulations before snow flies; yard dealers, who are desirous of liquidating stocks acquired for speculation, are pressing tonnages on the market, and buyers have been quick to sense the advantage given to them. Additional stress is placed on the market by mills in again curtailing shipments.

The net result of the whole situation is that prices not only have receded in the week, but the structure is left weak and with little available support to stand against pressure which it seems certain buyers will exert.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$11.50 to $12.00
Shoveling steel	11.50 to 12.00
Frogs, switches and guards, cut apart, and misc. rails	12.50 to 13.00
Hydraul. compressed sheets	9.75 to 10.25
Drop forge flashings	8.60 to 9.00
No. 1 busheling	9.00 to 9.50
Forg'd cast and r'l'd steel carwheels	15.00 to 15.50
Railroad tires, charg. box size	15.50 to 16.00
Railroad leaf springs cut apart	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.00 to 13.50
Coil springs	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings	11.25 to 11.75
Low phos. punchings	13.00 to 13.50
Low phos. plates, 12 in. and under	13.00 to 13.50
Blast Furnace Grades:	
Axle turnings	8.00 to 8.50
Cast iron borings	6.50 to 7.00
Short shoveling turnings	5.50 to 6.00
Machine shop turnings	5.25 to 5.75
Rolling Mill Grades:	
Iron rails	13.00 to 13.50
Rerolling rails	14.00 to 14.50
Cupola Grades:	
Steel rails, less than 3 ft.	14.00 to 14.50
Steel rails, less than 2 ft.	14.25 to 14.75
Angle bars, steel	13.00 to 13.50
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	12.00 to 12.25
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	12.00 to 12.50
Iron arch bars, and transoms	13.00 to 13.50
Iron car axles	21.50 to 22.00
Steel car axles	15.00 to 15.50
No. 1 railroad wrought	9.25 to 9.75
No. 2 railroad wrought	10.25 to 10.75
No. 1 busheling	7.50 to 8.00
No. 2 busheling	6.00 to 6.50
Locomotive tires, smooth	13.50 to 14.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	11.00 to 11.50
No. 1 railroad cast	10.00 to 10.50
No. 1 agricultural cast	9.50 to 10.00
Stove plate	8.50 to 9.00
Grate bars	8.50 to 9.00
Brake shoes	8.50 to 9.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.90c.
Reinforc'g bars, billet steel—	
Less than 5 tons	2.85c.
5 tons to 30 tons	2.45c.
30 tons to 200 tons	2.00c.
200 tons and over	1.75c.
Rail steel reinforcement—	
Less than 5 tons	2.50c.
5 tons to 30 tons	2.10c.
30 tons and over	1.50c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.35c.
Flats and squares	3.85c.
Bands (⅞ in. in Nos. 10 and 12 gages)	3.10c.
Hoops (No. 14 gage and lighter)	3.65c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes (⅞ in. and larger)	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60 and 10
Carriage bolts	60 and 10
Coach or lag screws	60 and 10
Hot-pressed nuts, sq., tap. or blank,	60 and 10
Hot-pressed nuts, hex., tap., or blank,	60 and 10
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.30 to 2.55
Cement c't'd nails, base per keg	2.30 to 2.55

CLEVELAND — Steel Trade Improvement Fails to Hold—Ingot Output Reduced

CLEVELAND, Oct. 14.—The improvement in the steel market that developed during September is not being maintained this month. There was a slight slowing down during the week in the demand for finished steel, particularly for sheets. With the exception of the placing of a fair tonnage by one motor car manufacturer, very little business came from the automobile industry in Michigan during the week. Demand from local automobile parts makers is spotty and other consuming industries are ordering steel only in small lots as needed.

While metal-working plants are maintaining recent operations of 35 to 50 per cent, they are not getting enough business to permit an increase in schedules. The bolt and nut industry finds encouragement in a slight gain in orders.

Decline in stock prices is having a sentimental effect on business, which is reflected in increased caution in making commitments for finished steel and steel products.

Steel plant operations in Cleveland, after remaining stationary at 50 per cent for three weeks, declined this week to 38 per cent by the shutting down of four open-hearth furnaces.

Another step in broadening the water transportation of steel on the Great Lakes was taken during the week when a shipment was made from the Pittsburgh district to Detroit by rail and water, the steel having been loaded on a boat at a Lake Erie port.

Pig Iron

Sharp concessions from ruling prices on foundry and malleable iron have been made by one producer, which is going well out of its territory to seek business and consequently must absorb considerable freight rates to meet the prices of furnaces located nearer to the point of consumption. While $16.50 is the usual minimum Lake furnace price for delivery to competitive points in Ohio, quotations of $16, and in some cases considerably lower prices, are reported on inquiries from central Indiana and western Pennsylvania. However, some furnaces are not inclined to go below $17, which appears to be holding fairly well in northern Ohio and northern Indiana. The Cleveland price for local delivery is unchanged at $17.50, furnace. In Michigan, the market is steady at $18.

The market in this immediate territory is inactive and Cleveland producers did not take much business in the outlying districts during the week. A Muncie, Ind., foundry is inquiring for 3000 tons of malleable iron for the first quarter. The Westinghouse Electric & Mfg. Co. has not yet purchased iron for its Cleveland plant.

Shipments are in about the same volume as during September.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$17.50
S'th'n fdy., sil. 1.75 to 2.25	$17.51 to 18.01
Malleable	17.50
Ohio silvery, 8 per cent	25.00
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge: $3 from Jackson, Ohio; $6.01 from Birmingham.

Iron Ore

Lake Superior ore on docks at Lake Erie ports Oct. 1 amounted to 6,043,489 tons, compared with 5,765,204 tons on the same date a year ago. Receipts at these ports during September were 4,721,474 tons and for season until Oct. 1 the total is 26,239,960 tons, against 36,575,811 tons during the corresponding period last year. Shipments from these docks during September were 3,220,829 tons and for the season until Oct. 1 were 19,406,840 tons, against 26,851,452 tons during the same period last year.

Semi-Finished Steel

There has been practically no contracting for billets, sheet bars and slabs for the fourth quarter, as third quarter contracts which were only partly specified against were carried over into the current quarter.

Sheets

While an improvement in the demand for metal furniture and enameling sheets is reported, the aggregate tonnage booked during the week declined, owing evidently to the very limited amount of business that came from the automotive industry. Some good orders for tack plate came from the East. Vitreous enameling sheets have been reduced $2 a ton to 3.70c., Pittsburgh. The market shows a weak tone except on auto body sheets. On black sheets, 2.35c., Pittsburgh, has become quite general except for small lots, although some of the mills are not meeting this price. A range is reported on blue annealed sheets from 1.95c. to 2.15c. for No. 13 and on light plates from 1.80c. to 2c. for No. 10. While the lower prices are usually being named by continuous mills, jobbing mills are making concessions.

Strip Steel

Mills are getting a number of orders for hot-rolled strip from the automotive and other industries, but they are for small lots and the aggregate tonnage is light. Hot-rolled material is firm at 1.60c., Pittsburgh, for wide and 1.70c. for narrow. While quotations of 1.65c. and 1.75c. have not entirely disappeared, mills are not asking the higher prices except for small lots. Cold-rolled strip remains dull. This is commonly quoted at 2.35c., Cleveland, with small lots in some cases bringing 2.45c.

Bars, Plates and Shapes

Bar specifications are rather light, reflecting the continued inactivity in the automotive industry. Orders are for small lots. A moderate amount of business is coming out in plates for making small tanks. Not much structural material is moving. No local inquiry of any size for building construction is pending and little work is in prospect. The latest sizable inquiry on which Ohio fabricators are figuring is the Indiana-Kentucky highway bridge requiring 7600 tons.

Bars are unchanged at 1.60c., Cleveland, for outside shipment and at 1.65c. for local delivery. While plates and shapes are commonly quoted at 1.60c., Pittsburgh, the price is firmer on shapes than on plates.

Wire Products

Demand continues slow. While weakness in nails appears less prevalent than recently, there are still reports of shading to $1.90 a keg in some parts of Ohio.

Rails and Track Supplies

The Wheeling & Lake Erie Coal Mining Co. has placed orders for 500 tons of light rails and 26,000 steel mine ties.

Old Material

Steel-making scrap has again declined about 25c. a ton on purchases by dealers, who are able to buy scrap at concessions if they have a consumer to whom they can ship the material. Other grades are also weak. While prices are untested on blast furnace scrap, the market is regarded as about 50c. a ton lower.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$11.25 to $11.75
No. 2 heavy melting steel	10.75 to 11.25
Compressed sheet steel	11.25 to 11.75
Light bundled sheet stampings	9.00 to 9.25
Drop forge flashings	10.00 to 10.50
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	8.00 to 8.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	11.00 to 11.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., billet bloom and slab crops	17.50 to 18.00
Blast Furnace Grades:	
Cast iron borings	7.50 to 8.00
Mixed borings and short turnings	7.50 to 8.00
No. 2 busheling	7.00 to 7.50
Cupola Grades:	
No. 1 cast	13.00 to 13.50
Railroad grate bars	10.00 to 10.50
Stove plate	10.50 to 11.00
Rails under 3 ft	16.00 to 16.50
Miscellaneous:	
Rails for rolling	16.25 to 16.50
Railroad malleable	15.00 to 15.50

NEW YORK

Pig Iron Volume Steady—Steel Buying Shows No Improvement

NEW YORK, Oct. 14.—Pig iron sales, at 8500 tons, compare with 9000 tons in the previous week. Aside from several large outstanding inquiries covering the first quarter of next year, on which no action has been taken, there are few sizable pending tonnages in the market. A fair volume of spot business is being booked, however, and so far as can be foreseen the rate of buying that has prevailed throughout the past several months will be maintained. Shipments continue at an unchanged rate and foundry operations apparently are no lighter than they have been.

Prices are highly competitive in this district, but are substantially unchanged, with Buffalo iron at $15.50, base furnace, and Southern iron at $11 to $11.50, base Birmingham. Eastern Pennsylvania iron ranges widely in price according to competitive prices encountered at different points of delivery. All the way from $17 to $18.50, furnace, is reported. Coincident with a reduction of $1 a ton in Buffalo iron prices for delivery in and near Buffalo is an unverified report that Alabama iron has recently been shipped by barge to western New York points.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.41 to $20.91
*Buff. No. 2, del'd east. N. J.	18.78 to 19.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	18.89 to 19.39
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	18.89 to 19.89

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business

Although buying from stock this month has been better than in September, the total of business is still rather small. Demand for structural steel is limited to small lots, but there is fair activity in blue annealed and galvanized sheets. Concessions in sheet prices continue, ranging from $1 to $3 and more a ton.

Finished Steel

The volume of steel buying in this district has made no gain during the past week, but is holding at about the level of the preceding weeks, October and late September. With half of October gone, the outlook for seasonal improvement is not bright.

The price situation is marked by a fair degree of steadiness, except on sheets. Black sheets are commonly 2.40c., Pittsburgh, with 2.35c. available to buyers of large lots. Galvanized sheets did not get much, if any, above 3c., Pittsburgh, in this territory and that price remains representative of the market. Fresh competition has broken out between jobbing mill makers of blue annealed sheets and the continuous mill product. The jobbing mill products are being sold as low as 1.90c., Pittsburgh, for No. 10 gage and 2.05c. for No. 13 gage, with continuous mill sheets often $2 a ton below these levels. Plates and shapes are fairly steady at 1.70c., Coatesville, for the former and 1.70c., Bethlehem, for the latter, this quotation reflecting the general market on both products. Concessions are apparently available only on the exceptional tonnages. The steel bar market has steadied at a range of 1.60c. to 1.65c., Pittsburgh, the higher price applying on small lots. On cold-rolled strip steel, even small buyers are now able to obtain quotations of 2.35c., Pittsburgh or Cleveland.

Cast Iron Pipe

Producers of pressure pipe are booking only a small tonnage of water pipe and do not expect much improvement in buying before November, when gas pipe buying for spring delivery usually begins. The only recent pipe purchase of consequence was about 2300 tons of 20-in. pipe bought by a public utility company in New York for Lexington, Ky. The order is reported placed with the United States Pipe & Foundry Co.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $38.90 to $39.90; 4-in. and 5-in., $41.90 to $42.90; 3-in., $48.90 to $49.90. Class A and gas pipe, $3 extra.

Reinforcing Bars

The largest letting of the week was 800 tons for a ramp from Riverside Drive to the Fort Lee Bridge, Manhattan, which went to Igoe Brothers. The total volume of bar business has declined rather sharply of late. New York State road jobs continue to be let every three or four weeks, but frequently mesh is bought for this work instead of bars. The steel for route 4, section 3, Bergen County, N. J., amounting to 1200 tons, has not yet been placed. For mill shipment, distributers of concrete bars are quoting 1.70c. a lb., Pittsburgh, on building and paving work, and 1.80c. on subway work (rail steel offered at $4 a ton less); for delivery from local stock, 2.35c. a lb., New York, up to 3.05c. a lb. for lots of less than 2 tons.

Coke

Demand for heating coke has not yet made its appearance and foundry coke specifications are in unchanged volume. Furnace coke prices range from $2.50 to $2.60 a net ton, Connellsville, while foundry coke quotations follow:

Special brands of beehive foundry coke $4.70 to $4.85 a net ton, ovens, or $8.41 to $8.56 delivered to northern New Jersey. Jersey City and Newark, and $9.29 to $9.44 to New York and Brooklyn; by-product foundry coke, $9 to $9.40, Newark or Jersey City; $10.06, New York or Brooklyn.

Old Material

The trend of prices on all grades of scrap is downward. Brokers filling contracts for heavy breakable cast scrap at a Florence, N. J., foundry have reduced their buying price to $11.50 a ton, delivered. Cast borings and mixed borings and turnings are off about 50c. a ton on recent purchases, brokers offering only $4 to $4.50 a ton, New York. No. 1 heavy melting steel has been sold to an eastern Pennsylvania consumer at $12.50, delivered, and brokers are endeavoring to buy steel at $12 to $12.25, delivered.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$9.00 to $10.25
Heavy melting steel (yard)	5.75 to 6.25
No. 1 hvy. breakable cast	8.00 to 9.00
Stove plate (steel works)	6.00 to 6.25
Locomotive grate bars	6.00 to 6.50
Machine shop turnings	5.00 to 5.25
Short shoveling turnings	5.00 to 5.50
Cast borings (blast fur. or steel works)	4.50 to 4.75
Mixed borings and turnings	4.50 to 5.00
Steel car axles	17.00
Iron car axles	19.00 to 19.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.50 to 8.00
Forge fire	7.00 to 7.50
No. 1 railroad wrought	9.75
No. 1 yard wrought, long	8.75
Rails for rolling	9.50 to 10.00
Stove plate (foundry)	7.00
Malleable cast (railroad)	10.50 to 11.00
Cast borings (chemical)	8.50 to 9.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$14.00
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size	12.00
No. 2 cast (radiators, cast boilers, etc.)	11.50

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars, small shapes	3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Blue ann'l'd sheets (No. 10)	3.25c. to 3.40c.
Black sheets (No. 24*)	3.65c. to 3.75c.
Galvanized sheets (No. 24*)	4.25c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	65
1 x 30 in. and smaller	65
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65
¾ x 20 in. and smaller	65
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in	$19.00
Seamless steel, 2-in	20.25
Charcoal iron, 2-in	26.25
Charcoal iron, 4-in	67.00

PHILADELPHIA

Mill Operations Unchanged—Steel Prices Lack Strength

PHILADELPHIA, Oct. 14.—There is almost no variation in the volume of steel business being entered on mill order books, tonnage in most cases being sufficient to sustain rolling mill operations at about 50 per cent. Black and galvanized sheet prices have apparently settled to 2.40c., Pittsburgh, for black and 3c., Pittsburgh, for galvanized. Steel bars are generally at 1.60c., Pittsburgh. Plates and shapes are being maintained at 1.70c. a lb., mill, except for occasional concessions of about $1 a ton to large fabricators and jobbers. Fabricators are quoting on more business in this district than for some weeks. Plans are being prepared by the United Gas Improvement Co., Philadelphia, for a gas holder, which will require upward of 1000 tons of plates.

Pig Iron

Competition of Southern pig iron at $11.50 a ton, Birmingham, is still a factor in depressing eastern Pennsylvania foundry iron prices. Malleable iron foundries are fairly well engaged, and have been buying slightly heavier tonnages of iron in the past few weeks. Inquiry for first quarter delivery continues, but only a limited total has been contracted for, sellers showing little desire to sell so far ahead at present prices, and consumers evidently not being certain enough of the future trend of business to contract heavily. Recent sizable inquiries from the Baldwin Locomotive Works and the General Steel Castings Corpn., Eddystone, Pa., and the Standard Steel Works Co., Burnham, Pa., are believed by sellers to have been largely for the purpose of testing the market and stimulating a buying movement. Of the iron inquired for by these three companies, only 1000 tons of basic has been bought by General Steel Castings.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$18.76 to $19.26
East. Pa. No. 2X, 2.25 to 2.75	19.26 to 19.76
East. Pa. No. 1X	19.76 to 20.26
Basic (del'd east. Pa.)	17.75 to 18.25
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Steel Bars

The price of merchant steel bars has settled to 1.60c. a lb., Pittsburgh, or 1.89c., delivered Philadelphia, even on small lots. Consumption of bars in this district continues fairly steady. Reinforced concrete projects are increasing. Bids are being taken on a factory in Camden, N. J., for the Campbell Soup Co., requiring about 700 tons of bars. Billet steel bars are unchanged at 1.75c. to 1.85c., Pittsburgh, or 2.04c. to 2.14c., delivered Philadelphia. Rail steel bars range from 1.55c. to 1.65c., Franklin, Pa., or 1.84c. to 1.94c., delivered Philadelphia, with no extra for cutting to length or bending.

Shapes

Most new business is being booked at 1.70c. a lb., f.o.b. nearest mill to consumer, or 1.76c., delivered Philadelphia. Desirable orders from fabricators and for jobbers' stocks occasionally bring concessions of $1 a ton from this price.

Plates

Mills are booking sufficient tonnage to maintain about 50 per cent operation in their rolling departments. There is little pressure from buyers for concessions, which are limited to occasional shading of about $1 a ton on desirable tonnages from fabricators or for jobbers' stocks. Quotations continue at 1.70c., Coatesville, Pa., or 1.80½c., delivered Philadelphia.

Sheets

Consumers in this district are operating at fair rates in many cases, but are buying only for immediate requirements. Sheet prices are generally unchanged, with black sheets ranging from 2.40c. to 2.45c. a lb., Pittsburgh, or 2.69c. to 2.74c., delivered Philadelphia, and galvanized sheets at 3c., Pittsburgh, or 3.29c., delivered Philadelphia, Blue annealed sheets, No. 13 gage, are quoted at 2.15c., Pittsburgh, or 2.44c., Philadelphia, and blue annealed plates, No. 10 gage, are 2c., Pittsburgh, or 2.29c., delivered Philadelphia. When competition is encountered from continuous mill sheets, concessions of $2 a ton are commonly granted. The Claymont, Del., producer of plates, which has just completed installation of a sheet mill, is quoting on blue annealed sheets, Nos. 10 to 16 gage.

Imports

In the week ended Oct. 11, 6577 tons of pig iron arrived at this port, of which 5000 tons was from British India and 1577 tons from the United Kingdom. Steel imports consisted of 125 tons of structural shapes from Germany.

Old Material

No. 1 heavy melting steel is off 50c., following purchase of a small tonnage by an eastern Pennsylvania consumer at $12.50 a ton, delivered. Other transactions are limited to occasional carload sales of various grades.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$12.50
No. 2 heavy melting steel	$10.50 to 11.00
Heavy melting steel (yard)	10.00
No. 1 railroad wrought	14.75 to 15.00
Bundled sheets (for steel works)	9.50
Hydraulic compressed, new	11.00 to 11.50
Hydraulic cimpressed, old	9.00 to 9.50
Machine shop turnings (for steel works)	9.00
Heavy axle turnings (or equiv.)	11.50 to 12.00
Cast borings (for steel works and roll. mill)	8.50 to 8.75
Heavy breakable cast (for steel works)	11.50 to 12.00
Railroad grate bars	10.00
Stove plate (for steel works)	10.00
No. 1 low phos., hvy., 0.04% and under	20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
No. 1 blast f'nace scrap	8.00 to 8.50
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	18.00 to 18.50
Steel axles	20.50 to 21.00
No. 1 forge fire	11.00 to 11.50
Cast iron carwheels	15.00
No. 1 cast	13.00 to 13.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	13.50 to 14.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.60c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.70c.
Cold-fin. steel, rounds and hex	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.25c.
Steel bands, No. 12 to ⅛-in. inclu.	3.00c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.70c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.15c.
Blue ann'l'd sheets (No. 13)	3.30c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

A report that E. J. Lavino & Co., Philadelphia, ferromanganese producers, had acquired jointly with other interests the Georgia Manganese & Iron Co., Brunswick, Ga., is stated to be premature. The report was based on the fact that the Georgia company went into a receivership July 1, and application has been made by the bond holders and creditors, to have the plant and property of the company sold at foreclosure. While certain interests in Georgia have approached E. J. Lavino & Co. with a proposal to acquire the company at public sale and operate it, no action can be taken until a court order is received, probably some weeks hence.

BIRMINGHAM

Pig Iron Melters Buying Only for Current Consumption

BIRMINGHAM, Oct. 14.—Owing to the large percentage of buying that is being done on a hand-to-mouth basis, current consumption is regulating demand to an extent far beyond any influence it has exerted at comparable periods in recent years. Occasional sales are reported on a contract basis, but the bulk of new business continues to be made up of small orders for quick shipment. As this policy has been followed for months, it is attributed to causes other than price factors. On all sales for district delivery the merchant producers continue to hold firmly to $14, base Birmingham. Shipments this month have been running close to the make and slightly ahead of those for the corresponding periods in September.

The Woodward Iron Co. is installing machinery for the production of machine cast pig iron at Woodward furnaces.

There were no changes in blast furnace operations last week. Of the 10 active furnaces, eight are on foundry iron and two on basic iron.

Finished Steel

New business is developing at about the rate of the two preceding weeks. This is the first time in years that wire products have failed to show appreciable gains from week to week at this season. Backlogs in all lines are light and mill operations are supported largely by current orders specifying early deliveries. Consumers and jobbers are reported to be carrying minimum stocks. Quotations on bars are off $1 a ton at 1.80c. to 1.85c. Other quotations are without change. Large orders continue to bring out concessions, as has been the case for some time.

An order for 12,000 tons of rails has been placed with the Ensley mill by a Southern railroad. Other railroads have signified intentions of buying, but have not revealed tonnages that are to be ordered.

Active open-hearths total seven of 23, the same as last week.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.00
No. 1 fdy., 2.25 to 2.75 sil.	14.50
Basic	14.00

Cast Iron Pipe

Demand is lighter and the outlook less favorable than 30 days ago. This change is attributed to failure of several municipal construction programs to develop. Some cities in this territory have voted down proposed bond issues; other have postponed work on account of an unsuitable market for bonds already voted. Industrial demand is off some. The United States Pipe & Foundry Co. has booked 2200 tons for Long Beach, Cal. New orders of the American Cast Iron Pipe Co. include 150 tons for Madison, Wis., and 90 tons for San Francisco. The Rudisill Soil Pipe Co., Anniston, Ala., has booked an order for 11,000 ft. of soil pipe for United States Government work at Panama. New projects coming into the market last week involved small tonnages. Both production and shipments held their own last week. Prices are unchanged at $37 to $38 a ton, base Birmingham.

Coke

The first two weeks of October have seen a lighter demand for foundry coke than for any other comparable period in several years. The movement has been under the September rate. Foundries are carrying less stocks than at this time last year. The price of $5, base Birmingham, is without change.

Old Material

Sales in the past 10 days have been confined to small-lot spot orders. Shipments of steel grades are off some from last month. Dealers report no reliable indications of a nearby improvement. One or two larger users of cast iron scrap were offering to buy attractive tonnages last week at $1 a ton less than was recently paid, but dealers did not accept.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel		$12.00
Scrap steel rails	$12.50 to	13.00
Short shoveling turnings		9.00
Cast iron borings		9.00
Stove plate		10.00
Steel axles		21.00
Iron axles		23.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.50
No. 1 cast		11.50
Tramcar wheels		11.50
Cast iron borings, chem.		13.50
Cast iron carwheels		12.00

CANADA

Structural Steel Features Business in Dominion

TORONTO, Oct. 14.—With the majority of melters who place future contracts covered to the end of the year, business in the Canadian pig iron markets is again largely confined to spot sales. The demand for merchant iron for early delivery is picking up gradually, however, and sales for the week were in better total volume than for several weeks past. Melters are holding their orders to immediate requirements and appear reluctant to place large tonnage contracts. Local blast furnace representatives point out that they are getting no business from implement makers, who continue to import supplies from the United States. Pig iron prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	22.50

Rails

The Algoma Steel Corpn., Sault Ste. Marie, Ont., which will start up its rail mill this week, has received orders for approximately 25,000 tons of rails, including an order closed during the week for 3600 tons for the Pere Marquette Railway. Orders generally have been small, ranging from 3000 to 9000 tons. Heavy bookings from the Canadian railways are expected in November and December.

Structural Steel

The demand for structural steel has been one of the bright spots in the Canadian steel industry of late. Several large tonnage contracts have been closed within the past two or three weeks and other substantial orders are pending. Most of the new business is from the Montreal district. The contract for heavy girders to be used in the main viaduct for the Canadian National Railways, which forms part of the terminal plan for the city of Montreal, has been awarded to the Dominion Bridge Co. The order calls for 5000 to 8000 tons. A number of smaller contracts were also closed during the week.

Old Material

Price reductions, as announced last week, have had little or no effect on stimulating business in this market. Mills continue to buy sparingly, with orders confined to heavy melting steel, with no market reported for turnings. In the Montreal district, the demand for steel scrap has virtually disappeared. Consumers of iron grades, however, are showing more interest in the market and some fairly good tonnages have been booked. Prices are unchanged.

Dealers' buying prices for old material:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	....	10.00
Stove plate	....	8.00
Standard carwheels	....	8.50
Malleable	....	8.00
Per Net Ton		
No. 1 mach'ry cast	11.00	....
Stove plate	9.00	....
Standard carwheels	10.00	....
Malleable scrap	9.00	....

Interstate Iron Co., Virginia, Minn., has ordered an iron ore screening plant from the Link-Belt Co., Chicago.

BOSTON

Business in All Lines Declines—Prices Are Unsettled

BOSTON, Oct. 14.—Business in iron and steel and associated lines dropped to small proportions the past week. Pig iron sales fell just short of 2500 tons, of which the Mystic Iron Works took the major portion. Most of the No. 2X Buffalo iron sold brought $16 a ton, on cars furnace, but that grade, as well as No. 1X, can be bought in round tonnages at 50c. a ton less, while furnaces east of Buffalo are meeting the delivered Buffalo price or shading it rather than let tonnages get away from them. There is no business of importance in view and, unless general business conditions materially change, most New England foundries are covered for the next two or three months.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$19.78 to	$20.28
†Buffalo, sil. 2.25 to 2.75	19.78 to	20.28
*Buffalo, sil. 1.75 to 2.25	20.41 to	20.91
*Buffalo, sil. 2.25 to 2.75	20.91 to	21.41
Va., sil. 1.75 to 2.25		25.21
Va., sil. 2.25 to 2.75		25.71
*Ala., sil. 1.75 to 2.25		21.11
*Ala., sil. 2.25 to 2.75		21.61
†Ala., sil. 1.75 to 2.25		17.25
†Ala., sil. 2.25 to 2.75		17.75

Freight rates: $4.91 all rail and $4.28 rail and water from Buffalo; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Fabricated Steel

The week was the dullest experienced by fabricators in a long time. Backlogs of the largest fabricators have been reduced materially; consequently competition even for small tonnages is very keen and whatever firmness in prices prevailed a month or so ago has been dissipated. It is expected a sizable tonnage of plates will be placed this week for a central Massachusetts municipal water project.

Reinforcing Steel

Sales are few and far between and in small quantities, with prices unsettled. About 2000 tons of billet steel bar business is hanging over the market, but buyers are in no hurry to cover. Billet steel bars are quoted from stock as follows: 1 to 5-ton lots, 3c. a lb., base; 6 to 99-ton lots, 2.50c. to 2.55c.; 100-ton lots and larger, 2.25c.

Cast Iron Pipe

Hopkinton, Mass., has placed 300 tons of 6-in. pipe with the Warren Foundry & Pipe Co. Car lot business in the aggregate was not much more than 100 tons. It is reported Concord, N. H., will buy 8000 ft. of 12-in. sand spun pipe this week. Several large tonnages are in the making, but it is believed they will not be placed for a month at least. East Hartford, Conn., has preliminary plans for about $23,500 worth of 8, 10 and 14-in. pipe. The market for Class B pipe is generally $36 a ton, f.o.b. foundry. A $3 differential is asked on Class A and gas pipe.

Old Material

Business was in the doldrums the past week, and there was an accompanying sagging in prices. Buyers who were offering $4.25 a ton, on cars, a week ago for steel turnings have now set $4.10 as their limit, but the most recent sales have been at $3.85. Steel mill borings at $4 a ton or more have passed out of the picture, current sales being at $3.75 or $3.85. The top price on forge flashings has dropped 25c. a ton to $7.25. One firm is offering $3.50 to $3.60 a ton for mixed borings and turnings, but $3.10 is all that most concerns will pay. Quotations on shafting and steel axles continue to take a wide range, the highest representing Pennsylvania shipments and the lowest material for New England delivery. Curtailed pipe shipments have brought slightly easier prices. Few brokers have orders for No. 1 heavy melting steel, and those who have are offering lower prices. There is nothing to suggest when scrap exports will be resumed.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to	$8.50
Scrap T rails	8.00 to	8.50
Scrap girder rails	7.00 to	7.50
No. 1 railroad wrought	8.00 to	8.50
Machine shop turnings	3.85 to	4.10
Cast iron borings (steel works and rolling mill)	3.75 to	3.85
Bundled skeleton, long	6.00 to	7.00
Forge flashings	6.50 to	7.25
Blast furnace borings and turnings	3.10 to	3.50
Forge scrap	5.75 to	6.50
Shafting	13.00 to	14.00
Steel car axles	15.00 to	17.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	6.50 to	7.00
Rails for rolling	10.00 to	10.25
Cast iron borings, chemical	9.00 to	9.50

Prices per gross ton deliv'd consumers' yards:

Textile cast	$11.00 to	$11.50
No. 1 machinery cast	12.50 to	13.50
No. 2 machinery cast	10.50 to	11.50
Stove plate		8.00
Railroad malleable	14.00 to	14.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.365c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	3.50c. to 5.55c.
Squares and flats	4.00c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Lag screws	60 and 5
Hot-pressed nuts	60 and 5
Cold-punched nuts	60 and 5
Stove bolts	70 and 10

CINCINNATI

Demand for Sheets Declines—Pig Iron Sales Small—Scrap Weaker

CINCINNATI, Oct. 14.—With district melters apparently covered for their current needs, demand for pig iron in this district has receded. District furnace representatives report total sales in the week of about 1300 tons, all of which was for spot shipment. The only inquiry is from central Indiana and calls for 200 to 300 tons of Northern foundry iron. A recent check by a furnace representative on pending inquiries revealed that requests had been made by buyers merely to test the present market. Competition is keen. Most of the business closed is the result of direct sales solicitation. The blast furnace of the Hamilton Iron & Coke Co., Hamilton, Ohio, was blown out this week.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89 to	$21.39
Ala. fdy., sil. 1.75 to 2.25	15.19 to	16.19
Ala. fdy., sil. 2.25 to 2.75	15.69 to	16.69
Tenn. fdy., sil. 1.75 to 2.25	15.19 to	16.19
S'th'n Ohio silvery, 8 per cent		24.39

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke

With the melt still very low, the demand for foundry grades of coke is slow. Shipments against current contracts continue at the level that has prevailed for the last two months.

Finished Steel

A recession in new bookings of sheets was noted in the last week by the leading interest in this district. One unit of this company's plant, reported to have been operating at about 100 per cent for the last three weeks, has reduced production this week. No particular sheet consum-

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.35c.
Cold-fin. rounds and hex	3.80c.
Squares	4.30c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (25 kegs or more)	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

ing industry has been responsible for the decline in demand, the recession having been general.

Old Material

With district users of scrap curtailing shipments and new business virtually negligible, dealers have reduced their bids on heavy melting steel, No. 2 wrought, rails for melting, rails for rolling, cast iron borings and No. 1 busheling 50c., and on short rails bids have been reduced 25c. The Chesapeake & Ohio and the Southern Railway are offering their usual lists.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$10.50 to $11.00
Scrap rails for melting	11.50 to 12.00
Loose sheet clippings	7.00 to 7.50
Bundled sheets	9.50 to 10.00
Cast iron borings	6.00 to 6.50
Machine shop turnings	6.00 to 6.50
No. 1 busheling	8.75 to 9.25
No. 2 busheling	6.00 to 6.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	13.25 to 13.75
No. 2 railroad wrought	10.50 to 11.00
Short rails	15.75 to 16.25
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	12.50 to 13.00
Burnt cast	7.00 to 7.50
Stove plate	7.00 to 7.50
Brake shoes	7.00 to 7.50
Agricultural malleable	12.50 to 13.00
Railroad malleable	13.50 to 14.00

Scrap Declines Sharply In Detroit Market

DETROIT, Oct. 14.—In sympathy with the downward trend in other scrap markets and with the low rate of operation by consumers, prices again slipped off the past week, heavy melting steel having declined 25c. a ton and other items from 50c. to 75c. Dealers are anticipating further decreases the coming week.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$11.00 to $11.50
Borings and short turnings	5.50 to 6.00
Long turnings	5.00 to 5.50
No. 1 machinery cast	10.50 to 11.00
Automotive cast	12.25 to 12.75
Hydraul. comp. sheets	11.00 to 11.50
Stove plate	8.00 to 8.50
New No. 1 busheling	9.25 to 9.75
Old No. 2 busheling	4.75 to 5.25
Sheet clippings	7.50 to 8.00
Flashings	9.50 to 10.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.60c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.10c.
Galv. corrug. sheets	4.70c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

ST. LOUIS

Gain in Inquiries for Steel—Pig Iron Dull, Scrap Weaker

ST. LOUIS, Oct. 14.—Business placed with melters of pig iron in the St. Louis industrial district for fourth quarter has been disappointing. Specifications for their finished products have been backward, with the result that they are hesitant about buying pig iron, and the tonnage placed has been small. The carryover of pig iron from the preceding quarter also is affecting the placing of new business with the makers. The St. Louis Gas & Coke Corpn. continues to quote $17.50, f.o.b. Granite City. The leading Southern maker sold 300 to 400 tons at $12, Birmingham, although another furnace in that section has been making a price of $11.50 on desirable tonnage. Chicago interests are said to be shading their price on iron offered in this territory.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	$15.92 to 16.42
Northern malleable, deliv'd	19.16 to 19.66
Northern basic, deliv'd	19.16 to 19.66

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel

While orders for plates, shapes and bars have not shown an increase, there is a noticeable gain in the number of inquiries for stock material. Buying of sheets is only in fair volume. Railroad buying is light, and lines centering here have given no indications as to their rail requirements for 1931. Warehouse business is only fair and still considerably below last year's figures. Warehouse prices on some grades of sheets have been reduced 20c. per 100 lb. The only reinforcing bar project let during the week was the Globe-Democrat Building, an undetermined tonnage, to the Laclede Steel Co.

Old Material

Further weakness was shown in the scrap market during the last week, and prices on most items were down from 25c. to 50c. a ton. Mills in the district are buying very little, because, they say, they are not getting enough orders for their finished products. On top of that, railroad lists have been heavy, and offerings by the country dealers are increasing, as they endeavor to convert their stocks into cash. The leading consumer of busheling and borings and shoveling turnings in this district has been out of the market for these items for several months, and shows no disposition to buy soon.

Railroad lists: Southern Pacific, 5015 tons; Chesapeake & Ohio, 4953 tons; Wabash, 2042 tons; Chicago & Alton, 2150 tons; Missouri-Kansas-Texas, 2140 tons; New York, Chicago & St. Louis, 82 carloads; Chicago & Eastern Illinois, 10 carloads; Chicago Belt Railway, eight carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	$11.25 to $11.75
No. 1 heavy melting or shoveling steel	10.75 to 11.25
No. 2 heavy melting or shoveling steel	9.75 to 10.00
No. 1 locomotive tires	12.50 to 13.00
Misc. stand-sec. rails including frogs, switches and guards, cut apart	12.25 to 12.75
Railroad springs	13.75 to 14.25
Bundled sheets	7.00 to 7.50
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	7.50 to 8.00
Cast iron borings and shoveling turnings	5.50 to 6.00
Iron rails	10.00 to 11.00
Rails for rolling	12.75 to 13.25
Machine shop turnings	4.50 to 5.00
Heavy turnings	9.00 to 9.50
Steel car axles	16.50 to 17.00
Iron car axles	20.50 to 21.00
Wrot. iron bars and trans.	13.50 to 14.00
No. 1 railroad wrought	8.75 to 9.00
Steel rails, less than 3 ft.	14.50 to 15.00
Steel angle bars	11.50 to 12.00
Cast iron carwheels	11.50 to 12.00
No. 1 machinery cast	10.50 to 11.00
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	10.25 to 10.75
Stove plate	9.00 to 9.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00
Agricult. malleable	10.00 to 10.50

PACIFIC COAST

Seattle Takes Bids On 10,000-Ton Pipe Line

SAN FRANCISCO, Oct. 11.—(*By Air Mail*)—While awards, with the exception of cast iron pipe, were not numerous, the undertone is more favorable. Bids have been opened on a 10,000-ton pipe line for Seattle. Featuring awards were over 3000 tons of cast iron pipe for Los Angeles and 2000 tons for Oakland.

Pig iron prices per gross ton at San Francisco:

*Utah basic	$22.00 to $24.00
*Utah fdy., sil. 2.75 to 3.25	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25	22.00 to 24.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars

Demand for both reinforcing and merchant bars remains light. Prices on the former continue unchanged at 2.50c., base, on carload lots, both in the Los Angeles and San Francisco districts, while 2.35c., c.i.f., appears firm on mild steel bars. The Pacific Coast Steel Corpn. booked the largest order of the week, calling for 500 tons additional for the San Francisco ball park. Bids were opened this week on 400 tons for a new jail building in

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.40c.
Black sheets (No. 24)	4.35c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.00c.
Struc. rivets, ½-in. and larger	5.00c.
Com. wire nails, base per keg	$3.35
Cement c't'd nails, 100 lb. keg	3.35

Los Angeles and 400 tons for the Mills Building, San Francisco.

Pig Iron

Little improvement in demand is noted, most foundries having sufficient stocks to take care of immediate requirements. The Navy Department, San Francisco, will open bids Oct. 21 on 200 tons of foundry iron. No change in prices is reported.

Cast Iron Pipe

Los Angeles has placed 875 tons of 20 and 24-in. Class B pipe with the National Cast Iron Pipe Co., 813 tons of 16-in. Class 150 pipe with the United States Pipe & Foundry Co. and 1320 tons of 24-in. Class B pipe with the American Cast Iron Pipe Co. Grants Pass, Ore., awarded 950 tons of 6 to 12-in. Class 150 pipe to the Pacific States Cast Iron Pipe Co., and 250 tons of 16-in. Class 100 pipe with the United States Pipe & Foundry Co. This company also took 1762 of 6 to 16-in. Class 250 and B pipe for Oakland, Cal., and the Pacific States Cast Iron Pipe Co. booked 121 tons of 4-in. Class 150 pipe for the same city. The American Cast Iron Pipe Co. was low bidder on 331 tons of 6 to 12-in. Class 150 pipe for Fullerton, Cal.

Plates

Plate mill representatives and fabricators have their interest centered in the 10,000-ton pipe line for Seattle. This project calls for various sizes of steel pipe and an award is expected within 10 days. The Consolidated Steel Corpn. secured the sub-contract for a 55,000-bbl. tank for the naval operating base in San Diego, involving 260 tons. Prices continue to range between 2.05c. to 2.15c., c.i.f.

Structural Steel

Structural awards were less than 500 tons. The Minneapolis-Moline Power Implement Co. took 120 tons for a theater in San Pedro and the McClintic-Marshall Co. booked 100 tons for a warehouse in Los Angeles. Bids have been opened on 3500 tons for the Mills Building, San Francisco; on 100 tons for a hangar at Douglas, Ariz., and on 600 tons for a college building in Berkeley. New inquiries include 1500 and 1400 tons respectively for two theaters in Oakland. Shapes are unchanged at 2.15c. to 2.25c. c.i.f.

yards have entirely suspended operations, while others are under reduced schedules. One of the mills has reduced its offering prices on steel scrap to $12.50 for No. 1 and $11 for No. 2. So far the offer has not proved attractive to the dealers and no action has been taken.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$12.50 to $13.00
No. 2 heavy melting scrap	11.00 to 11.50
Scrap rails	12.00 to 12.50
Hydraulic comp. sheets	11.00 to 11.50
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	11.00 to 11.50
No. 1 busheling	11.00 to 12.00
Hvy. steel axle turnings	11.00 to 11.50
Machine shop turnings	6.00 to 7.00
No. 1 railroad wrought	10.00 to 10.50
Acid Open-Hearth Grades:	
Knuckles and couplers	15.00 to 15.50
Coil and leaf springs	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Low phos. billet and bloom ends	15.50 to 16.00
Electric Furnace Grades:	
Short shov. steel turnings	9.75 to 10.25
Blast Furnace Grades:	
Short mixed borings and turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
No. 2 busheling	7.00
Rolling Mill Grades:	
Steel car axles	15.00 to 15.50
Iron axles	19.00 to 19.50
Cupola Grades:	
No. 1 machinery cast	11.00 to 11.50
Stove plate	10.00 to 10.50
Locomotive grate bars	8.25 to 9.25
Steel rails, 3 ft. and under	15.00 to 15.50
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Industrial	14.25 to 15.25
Railroad	14.25 to 15.25
Agricultural	14.25 to 15.25
Special Grades:	
Chemical borings	11.50 to 12.00

BUFFALO Pig Iron Producers Reduce Prices $1 a Ton for District Delivery

BUFFALO, Oct. 14.—Effective today Buffalo producers of merchant pig iron have reduced prices $1 a ton for delivery to consumers in this district. New quotations are $17.50, furnace, for No. 2 plain, $18 for No. 2X, $19 for No. 1 foundry and $18 for malleable with silicon up to 2.25 per cent. Although there has been a gradual recession on Buffalo iron in recent months for shipment to outside competitive points, the district schedule has remained firm in the face of declines at Cleveland, Pittsburgh, eastern Pennsylvania and elsewhere.

Shipping specifications have been coming in a little better than in September, and there is considerable activity on the part of the producers in cleaning up the final shipments over the barge canal to the East. Sales have been approximately 4000 tons, all in small lots. Inquiry is at a low ebb, with nothing sizable being offered. There are two or three inquiries for 300 to 400 tons of foundry iron and the usual volume of carload lots.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$17.50
No. 2X fdy., sil. 2.25 to 2.75	18.00
No. 1 fdy., sil. 2.75 to 3.25	19.00
Malleable, sil. up to 2.25	18.00
Basic	17.50
Lake Superior charcoal	27.28

Finished Steel

Operations of Buffalo mills show little change from last week's schedule. The Lackawanna plant of the Bethlehem Steel Co. is operating 13 open-hearths, the Donner branch of the Republic Steel Corpn. is operating four; the Wickwire-Spencer Steel Co. is operating two and the Gould Coupler Co. one. The Seneca Iron & Steel Co. is continuing at 45 to 50 per cent. The reinforcing bars for the new cell block at the State prison at Attica, N. Y., involving 170 tons, has been awarded. Other small reinforcing jobs have been placed.

Old Material

The market during the past week has been almost lifeless. Most of the

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.15c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.60c.
Bands	3.50c.
Hoops	3.90c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.60
Black wire, base per 100 lb.	3.20

Steel Corporation's Unfilled Orders Fall Further

Another decrease in the unfilled orders of the United States Steel Corporation in September—155,866 tons—brought the total to the lowest level since October, 1927.

On Sept. 30 the unfilled orders were 3,424,338 tons, compared with 3,580,204 tons Aug. 31 and 4,022,055 tons July 31. A year ago the total was 3,902,581 tons. The total on Sept. 30 was 1,146,315 tons below that on March 31, the peak last spring.

Unfilled tonnage at the end of each month for the past two years and nine months follows:

	1930	1929	1928
January	4,468,710	4,109,487	4,275,947
February	4,479,748	4,144,341	4,398,189
March	4,570,653	4,410,718	4,335,206
April	4,354,220	4,427,763	3,872,133
May	4,059,227	4,304,167	3,416,822
June	3,968,064	4,256,910	3,637,000
July	4,022,055	4,088,177	3,570,927
August	3,580,204	3,658,211	3,624,043
September	3,424,338	3,902,581	3,698,368
October	.....	4,086,562	3,751,030
November	.....	4,125,345	3,673,000
December	.....	4,417,193	3,976,712

Total value (f.o.b. factory prices) of stoves and ranges, domestic heating apparatus and steam fittings produced in 1929 by 853 establishments was $502,418,765, an increase of 3.9 per cent, compared with $483,444,219 reported in 1927 by 796 manufacturers, according to the Bureau of the Census.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$31.00
Rerolling, 4-in. and under 10-in., Youngstown	31.00
Rerolling, 4-in. and under 10-in., Cleveland	31.00
Rerolling, 4-in. and under 10-in., Chicago	32.00
Forging quality, Pittsburgh	36.00

Sheet Bars
(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$31.00
Youngstown	31.00
Cleveland	31.00

Slabs
(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$31.00
Youngstown	31.00
Cleveland	31.00

Skelp
(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.60c. to 1.70c.
Universal	1.60c. to 1.70c.
Sheared	1.60c. to 1.70c.

Wire Rods
(Common soft, base)

	Per Gross Ton
Pittsburgh	$36.00
Cleveland	36.00
Chicago	37.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	8c. to 9c.
Iron ore, low phos., Swedish, average 68% iron	11c.
Iron ore, basic Swedish, average 65% iron	9c.
Manganese ore, washed 52% manganese, from the Caucasus	26c. to 28c.
Manganese ore, Brazilian, African or Indian, basic 50%	26c. to 28c.
Tungsten ore, high grade, per unit, in 60% concentrates	$12.00 to $14.00

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3 crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2 delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.65
Foundry, f.o.b. Connellsville prompt	3.25 to 4.75
Foundry, by-products, Ch'go ovens	8.00
Foundry, by-products, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.35
Mine run coking coal, f.o.b. W. Pa. mines	1.40 to 1.50
Gas coal, ¾-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	.55 to .65
Gas slack, f.o.b. W. Pa. mines	.90 to 1.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$94.00 to $99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $33.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	39.00

Bessemer Ferrosilicon
F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$26.50	13%	$32.50
11%	28.50	14%	34.50
12%	30.50	15%	37.00

Silvery Iron
F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$21.00	11%	$24.00
7%	21.50	12%	25.00
8%	22.00	13%	27.00
9%	22.50	14%	29.00
10%	23.00	15%	31.00

Delivered prices at Chicago are about 50c. a ton below this schedule.

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.30 to $1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucy mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	$17.00 to $17.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	73
†Carriage bolts	73
Lag bolts	73
Plow bolts, Nos. 1, 2, 3 and 7 heads	73
Hot-pressed nuts, blank or tapped, square	73
Hot-pressed nuts, blank or tapped, hexagons	73
C.p.c. and t. square or hex. nuts, blank or tapped	73
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	73
Semi-finished hexagon castellated nuts, S.A.E.	73
Stove bolts in packages, P'gh.	80, 10, 10 and 5
Stove bolts in packages, Chicago.	80, 10, 10 and 5
Stove bolts in packages, Cleveland.	80, 10, 10 and 5
Stove bolts in bulk, P'gh.	80, 10, 10, 5 and 2½
Stove bolts in bulk, Chicago.	80, 10, 10, 5 and 2½
Stove bolts in bulk, Cleveland.	80, 10, 10, 5 and 2½
Tire bolts	60, 10 and 10

Discounts of 73 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets
(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets
(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened.	80 and 5
Milled headless set screws, cut thread.	75 and 10
Upset hex. head cap screws, U.S.S. thread.	85 and 10
Upset hex. cap screws, S.A.E. thread.	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

▲▲▲ Mill Prices of Finished Iron and Steel Products ▲▲▲

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c. to 1.65c.
F.o.b. Chicago	1.70c.
Del'd Philadelphia	1.89c. to 1.94c.
Del'd New York	1.93c. to 1.98c.
F.o.b. Cleveland	1.60c. to 1.65c.
F.o.b. Lackawanna	1.70c. to 1.75c.
F.o.b. Birmingham	1.80c. to 1.85c.
C.i.f. Pacific ports	2.25c.
F.o.b. San Francisco mills	2.25c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.	1.70c. to 1.75c.
F.o.b. Birmingham, mill lengths	1.80c. to 1.85c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.55c. to 1.65c.
F.o.b. Chicago Heights mill	1.65c.
Del'd Philadelphia	1.84c. to 1.89c.

Iron

Common iron, f.o.b. Chicago	1.70c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.09c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c. to 1.75c.
F.o.b. Birmingham	1.80c. to 1.85c.
Del'd Cleveland	1.78½c.
Del'd Philadelphia	1.80½c. to 1.85½c.
F.o.b. Coatesville	1.70c.
F.o.b. Sparrows Point	1.70c.
F.o.b. Lackawanna	1.70c.
Del'd New York	1.88c.
C.i.f. Pacific ports	2.05c. to 2.15c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c. to 1.75c.
F.o.b. Birmingham	1.80c. to 1.85c.
F.o.b. Lackawanna	1.70c. to 1.75c.
F.o.b. Bethlehem	1.70c.
Del'd Cleveland	1.78½c.
Del'd Philadelphia	1.71c. to 1.76c.
Del'd New York	1.85½c.
C.i.f. Pacific ports	2.15c. to 2.25c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.70c. to 1.75c.
Wider than 6 in., P'gh	1.60c. to 1.65c.
6 in. and narrower, Chicago	1.80c. to 1.85c.
Wider than 6 in., Chicago	1.70c. to 1.75c.
Cooperage stock, P'gh	1.90c. to 2.00c.
Cooperage stock, Chicago	2.00c. to 2.10c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.35c. to 2.45c.
Strips, Cleveland	2.35c. to 2.45c.
Strips, del'd Chicago	2.63c.
Strips, Worcester	2.50c. to 2.60c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.60c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

	Base per Keg
Standard wire nails	$2.00 to $2.10
Cement coated nails	2.00 to 2.10
Galvanized nails	4.00 to 4.10

	Base per Lb.
Polished staples	2.60c. to 2.70c.
Galvanized staples	2.85c. to 2.95c.
Barbed wire, galvanized	2.80c. to 2.90c.
Annealed fence wire	2.15c. to 2.25c.
Galvanized wire, No. 9	2.60c. to 2.70c.
Woven wire fence (per net ton to retailers)	$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage	2.30c.
Spring wire	3.30c.

(Carload lots, f.o.b. Chicago)

Wire nails	$2.05 to $2.10
Annealed fence wire	2.40c. to 2.50c. (lb.)
Bright hard wire to manufacturing trade	2.35c.

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Light Plates

	Base per Lb.
No. 10, blue annealed, f.o.b. P'gh	1.90c. to 2.00c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.10c.
No. 10, blue annealed, del'd Phila.	2.32c. to 2.42c.
No. 10, blue annealed, B'ham	2.15c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.05c. to 2.15c.
No. 13, f.o.b. Chicago dist.	2.25c.
No. 13, del'd Philadelphia	2.44c.
No. 13, blue annealed, B'ham	2.30c.
Box Annealed, One Pass Cold Rolled	
No. 24, f.o.b. Pittsburgh	2.35c. to 2.45c.
No. 24, f.o.b. Chicago dist. mill	2.55c.
No. 24, del'd Philadelphia	2.64c. to 2.74c.
No. 24, f.o.b. Birmingham	2.60c. to 2.65c.
Steel Furniture Sheets	
No. 24, f.o.b. P'gh	3.60c. to 3.70c.
Galvanized	
No. 24, f.o.b. Pittsburgh	3.00c. to 3.10c.
No. 24, f.o.b. Chicago dist. mill	3.10c. to 3.20c.
No. 24, del'd Cleveland	3.18½c. to 3.28½c.
No. 24, del'd Philadelphia	3.29c. to 3.39c.
No. 24, f.o.b. Birmingham	3.15c.
Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh	2.70c.
No. 28, f.o.b. Chicago dist. mill	2.80c.
Automobile Body Sheets	
No. 20, f.o.b. Pittsburgh	3.50c.
Long Ternes	
No. 24, 8-lb. coating, f.o.b. mill	3.45c. to 3.55c.
Vitreous Enameling Stock	
No. 24, f.o.b. Pittsburgh	3.70c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.00
Standard cokes, f.o.b. Gary	5.10

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.30
15-lb. coating I.C.	12.90
20-lb. coating I.C.	14.00
25-lb. coating I.C.	$15.20
30-lb. coating I.C.	16.00
40-lb. coating I.C.	17.80

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bar	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 *Lb.*
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.07½
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	75 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49½	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discount of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discount a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Fabricated Structural Steel

New Projects of 43,000 Tons Smaller than a Week Ago—Awards Include Office and Apartment Buildings

NEW projects requiring about 43,000 tons of fabricated structural steel are smaller than a week ago, but awards are the largest since early in September, totaling more than 28,000 tons. Included in new construction is 10,000 tons for a Bell Telephone Co. laboratory building at 475 West Street, New York, 3500 tons for the Hotel Meurice, Central Park South, New York, 6600 tons in a bridge over the Ohio River at Pittsburgh, and 2300 tons in an electrical exhibit building for the World's Fair, Chicago.

Of the awards, almost 7000 tons is in New York office and apartment buildings, including 2000 tons for a United States Assay Office building, 2300 tons for an apartment building at East Fifty-seventh Street and First Avenue and 1000 tons for an apartment building on West Thirtieth Street. Other sizable awards of the week are 7000 tons for bridges in Kentucky and 1420 tons for furnaces and a building in Philadelphia for the Electro-Metallurgical Co. Awards follow:

North Atlantic States

NEW YORK, 2300 tons, apartment building, East Fifty-seventh Street and First Avenue, to Shoemaker Bridge Co.

NEW YORK, 700 tons, apartment building at 218 East Seventy-third Street, to Bethlehem Fabricators, Inc.

NEW YORK, 2000 tons, United States Assay Office, building at Old Slip, South and Front Streets, to Lehigh Structural Steel Co.

NEW YORK, 350 tons, addition to school No. 72, Borough of Bronx, to Lehigh Structural Steel Co.

NEW YORK, 1000 tons, apartment building on West Thirtieth Street, to Dreier Iron Works.

NEW YORK, 500 tons, addition to office building of Warner Brothers, West Forty-fourth Street, to Harris Structural Steel Co.

EAST ORANGE, N. J., 800 tons for Bell Telephone building, to Oltmer Iron Works, Jersey City.

BALTIMORE & OHIO RAILROAD, 215 tons, bridge at Ellwood City, Pa., to Fort Pitt Bridge Co.

BUFFALO, 170 tons, plant addition for G. H. Williams & Co., to Kellogg Structural Steel Co.

ATTICA, N. Y., 125 tons, cell block for State prison.

POTTSVILLE, PA., 320 tons, garage, to Lehigh Structural Steel Co.

PHILADELPHIA, 370 tons, warehouse for Wheeling Corrugating Co., to Belmont Iron Works.

PHILADELPHIA, 1420 tons, furnaces and building for Electro-Metallurgical Co., to Lackawanna Steel Construction Co.

PITTSBURGH, 2000 tons, eight barges for Gulf Refining Co., to McClintic-Marshall Co.

The South

SPOTTSVILLE, KY., 864 tons, bridge, to International Steel & Iron Co., Evansville, Ind.

BOONESBORO, KY., 401 tons, bridge, to Vincennes Bridge Co.

EGGNER'S FERRY, KY., 2336 tons, bridge, to Vincennes Bridge Co.

PADUCAH, KY., 2433 tons, bridge, to International Steel & Iron Co.

BURNSIDE, KY., 867 tons, bridge, to E. R. Mills, Charleston, W. Va.

MEMPHIS, TENN., 200 tons, three derrick boats for United States Engineer; two to Nashville Bridge Co., and one to Riter-Conley division, McClintic-Marshall Co.

PITTSBURGH & WEST VIRGINIA RAILROAD, 2800 tons, bridges, to American Bridge Co.

Central States

MONESSEN-SOUTHWESTERN RAILROAD, 800 tons, bridges, to McClintic-Marshall Co.

DETROIT, 390 tons, sub-structure for municipal power plant, to R. C. Mahon Co.

COLUMBUS, OHIO, 275 tons, teacher's training building, Ohio State University, to Pittsburgh-Des Moines Structural Steel Co.

DECATUR, ILL., 140 tons, armory, to Mississippi Valley Structural Steel Co.

ALGONQUIN, ILL., 450 tons, bridge, to American Bridge Co.

Western States

KANSAS CITY, MO., 1000 tons, arts building, to Kansas City Structural Steel Co.

SAN DIEGO, 260 tons, plates, 55,000-bbl. tank for naval operating base, to Consolidated Steel Corpn., previously reported to an unnamed bidder.

SAN PEDRO, CAL., 120 tons, theater, 488 West Sixth Street, to Minneapolis Steel & Machinery Co.

LOS ANGELES, 100 tons, warehouse, 6900 Stanford Avenue, to McClintic-Marshall Co.

LOS ANGELES, 100 tons, steel joists, to Soule Steel Co.

Canada

MONTREAL, 3000 tons, reconstruction of Canada Cement Co. plant, to Canadian World's Fair.

MONTREAL, 300 tons, foundry for Crane, Ltd., to Dominion Bridge Co.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

ANDOVER, MASS., 118 tons, chapel.

BOSTON & ALBANY RAILROAD, 100 tons, bridge at Niverville, N. Y.

MAINE CENTRAL RAILROAD, 575 tons, three bridges.

NEW YORK CENTRAL RAILROAD, 150 tons, grade crossings at Kitchawan, N. Y.

GENESEO, N. Y., 200 tons, normal school.

NEW PALTZ, N. Y., 200 tons, normal school.

NEW YORK, 10,000 tons, building for Bell Telephone Laboratories, 475 West Street; bids to be submitted soon.

NEW YORK, 3500 tons, Hotel Meurice, Central Park South and West Fifty-eighth Street.

NEW YORK, 1350 tons, apartment building for Bing & Bing at West Twelfth and Hudson Streets.

PITTSBURGH, 6600 tons, West End-North Side bridge over Ohio River; bids close Oct. 28.

PITTSBURGH, 1000 tons; Federal Reserve Bank building; general contractors' bids close Oct. 15.

PITTSBURGH, 660 tons, Washington school, Baker & Coombs, Washington, Pa., general contractor.

PITTSBURGH, 400 tons, sub-structure on South Tenth Street bridge over Monongahela River; general contractors' bids close Oct. 28.

PITTSBURGH, 200 tons, Mount Lebanon school; Pittsburgh Engineering & Contracting Co., general contractor.

LYCOMING COUNTY, PA., 740 tons, State highway Department bridge; T. J. Foley Co., Philadelphia, general contractor.

The South

BALTIMORE & OHIO RAILROAD, 2200 tons, bridges at Harpers Ferry, Va.

Central States

ST. PETER, MINN., 400 tons, highway bridge.

TRACY, IOWA, 600 tons, highway bridge.

CHICAGO, 2300 tons, electrical building for World's Fair.

BUFFINGTON, IND., tonnage not stated, Universal Atlas Cement Co.

GLENVIEW, ILL., 2000 tons, grandstand for Turf Club.

STATE OF MINNESOTA, 600 tons, highway bridges.

CHICAGO, 320 tons, Smyser public school.

MILWAUKEE, 750 tons, Wrought Washer Co.

JEFFERSON CITY, MO., 1689 tons; 689 tons for bridge across Meramec River near St. Louis, and 1000 tons for bridge across the Niangua River, Camden County.

Western States

DENVER & RIO GRANDE WESTERN, 700 tons, bridge across Green River, Utah.

DOUGLAS, ARIZ., 100 tons, hangar; bids opened.

SEATTLE, 10,000 tons, plates, pipe line; bids opened.

BERKELEY, CAL., 600 tons, building for University of California; bids opened.

OAKLAND, CAL., 1400 tons, Paramount Theater; bids being taken.

OAKLAND, 1500 tons, Warner Bros. theater; bids being taken.

Canada

GASPE, QUE., 3000 tons, bridge over York River for Gaspe Bridge Co., Ltd.

Republic Combines Western Sales Offices

Republic Steel Corpn., Youngstown, has announced the consolidation of its Western sales office and its Chicago district sales office. The combined offices will be in charge of H. S. Schroeder, as Western manager of sales. Norman W. Foy and L. J. Simmonds will be assistant managers of sales.

Mr. Schroeder has been Western manager of sales with headquarters in Chicago, and formerly was vice-president and general sales manager of the Interstate Iron & Steel Co., one of the component companies of the Republic merger. Mr. Foy formerly was manager of sales of the hot-rolled division, with headquarters in Youngstown, and Mr. Simmonds formerly was assistant district manager of sales in the Chicago district.

L. L. Caskey has been made assistant manager of sales in the Philadelphia district. He was formerly assistant manager of the strip steel division of the corporation.

▲▲▲ Non-Ferrous Metal Markets ▲▲▲

Tin at New Low Since 1902 —Copper Active—Lead and Zinc Down

NEW YORK, Oct. 14.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 14	Oct. 11	Oct. 10	Oct. 9	Oct. 8
Lake copper, New York	10.12½	10.12½	10.12½	10.12½	10.12½
Electrolytic copper, N. Y.*	9.75	9.75	9.75	9.75	9.75
Straits tin, spot, N. Y.	24.62½	....	25.20	25.62½	26.75
Zinc, East St. Louis	4.00	4.10	4.10	4.10	4.20
Zinc, New York	4.35	4.45	4.45	4.45	4.55
Lead, East St. Louis	4.95	4.95	5.00	5.00	5.10
Lead, New York	5.10	5.10	5.15	5.15	5.25

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Copper

Demand is fairly active, both for foreign and domestic account. Sales abroad yesterday were nearly 800 tons, with 500 tons booked this morning, bringing the total for the month to 52,000,000 lb., or over 23,200 gross tons. This compares with about 25,000 tons for all of August. In general, prices are firm at 10c., delivered in the Connecticut Valley, for electrolytic copper, with the quotation of Copper Exporters, Inc., at 10.30c., c.i.f., usual European ports. There was an offering today of about 1000 tons at 9.75c., delivered in the Connecticut Valley, this being characterized as distress metal. Lake copper is also fairly active at 10c. to 10.12½c., delivered.

September statistics were a distinct shock to the market. They showed an increase of copper above ground of about 16,000 tons. The favorable features in the statistics were an increase of about 8000 tons in shipments and a decrease of about 3000 tons in the output of refined copper. Another encouraging fact is the statement of one company that metal which had been sold for December delivery was being demanded for October shipment. Sales to wire companies and to some other users have been quite heavy.

Tin

Spot Straits tin sold today at 24.62½c., a new low since 1902, or in 28 years. Prices have been falling rapidly during the week and sales on the declining market have been fairly large. The total for the week is about 1000 tons. On each day in the past week, except on Oct. 10, the market closed with more sellers than buyers. On Oct. 10, however, the market was quite firm, with the best prices of the day at the close and with more buyers than sellers. Stocks in London warehouses for the week ended Oct. 11 were 24,744 tons, a decrease of 358 tons for the week. This is largely due to a shipment of 400 tons of English tin to the United States. London prices today were at new lows for many years, with spot standard quoted at £109 10s., future standard at £111, and spot Straits at £113 10s. The Singapore price today was £116. All of these quotations are about £12 a ton less than a week ago.

Lead

Because of rapidly falling prices in London during the week, the American Smelting & Refining Co. reduced its contract price twice, a final quotation of 5.10c., New York, having been established on Oct. 11, at which level the market still stands. The quotation in the outside market is 4.95c., St. Louis. Naturally, demand is restrained and consumers are buying only what they need for early October delivery. It is stated that supplies of the metal in the United States are only about enough for one month, which places the lead market in a quite satisfactory condition.

Zinc

Further weakness has developed in prime Western zinc and today the metal was sold at 4c., East St. Louis, or 4.35c., New York. The ruling factor is the law of supply and demand. It is believed that there is a background of considerable business, which will be placed when consumers are convinced that it is the time to buy. At present demand is, of course, small.

Antimony

In a very dull market, Chinese metal is quoted a little lower at 7.25c., duty paid, New York, for all positions.

Nickel

There is no change in the long-established quotations, with wholesale lots of ingot nickel available at 35c. a lb., with shot nickel at 36c., and electrolytic nickel in cathodes at 35c.

Aluminum

Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 22.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 14. — Sales of non-ferrous metals are steady and in fair volume but prices continue to sag. Transactions in the old metal market

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	17.00c.
Copper, hot rolled, base sizes	20.00c.
Copper, cold rolled, 14 oz. and heavier, base sizes	22.00c.
Seamless Tubes—	
Brass	22.00c.
Copper	22.25c.
Brass Rods	15.12½c.
Brazed Brass Tubes	24.67½c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	9.75c. to 10.25c.
Zinc sheets, open	10.75c. to 11.25c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	27.50c. to 28.50c.
Tin, bar	29.50c. to 30.50c.
Copper, Lake	11.75c.
Copper, electrolytic	11.50c.
Copper, casting	11.25c.
Zinc, slab	6.00c. to 7.00c.
Lead, American pig	6.00c. to 7.00c.
Lead, bar	8.00c. to 9.00c.
Antimony, Asiatic	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	24.00c. to 25.00c.
Alum. ingots, No. 12 alloys	23.00c. to 24.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	20.00c. to 21.00c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	30.00c.
Tin, bar	32.00c.
Copper, Lake	11.13c.
Copper, electrolytic	11.13c.
Copper, casting	10.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	5.75c. to 6.00c.
Lead, bar	8.50c.
Antimony, Asiatic	11.50c.
Babbitt metal, medium grade	15.25c.
Babbitt metal, high grade	34.00c.
Solder, ½ and ½	19.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (Prices quoted are nominal. Holders of metal are generally unwilling to part with stock at present low levels.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.25c.	9.00c.
Copper, hvy. and wire	8.00c.	8.75c.
Copper, light and bottoms	7.00c.	8.00c.
Brass, heavy	4.75c.	5.75c.
Brass, light	3.75c.	5.00c.
Hvy. machine composition	7.25c.	8.25c.
No. 1 yel. brass turnings	5.00c.	5.75c.
No. 1 red brass or compos. turnings	6.50c.	7.50c.
Lead, heavy	3.75c.	4.25c.
Lead, tea	2.50c.	3.00c.
Zinc	2.25c.	2.75c.
Sheet aluminum	7.50c.	9.50c.
Cast aluminum	7.00c.	9.00c.

are more frequent and tonnages being moved are larger.

Prices per lb. in carload lots: Lake copper, 10.12½c.; tin, 25.50c.; lead, 5.05c.; zinc, 4.10c.; in less-than-carload lots, antimony, 8.50c. On old metals we quote copper wire, crucible shapes and copper clips, 7.50c.; copper bottoms, 6.50c. to 7c.; red brass, 6.50c. to 7c.; yellow brass, 4.50c. to 5c.; lead pipe, 3.75c. to 4c.; zinc., 1.50c. to 1.75c.; pewter, No. 1, 15c.; tin-foil, 16c.; block tin, 22c.; aluminum, 6.50c. to 7c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Deliveries of Cars Show Gain Over 1929 Totals

ALTHOUGH the outlook for railroad equipment buying during the remainder of the year is not bright, the railroad car builders note with some satisfaction that deliveries of cars thus far in 1930 exceed those of the same period in 1929. For nine months this year, deliveries of freight cars for domestic use totaled 60,576 units, in addition to which 1266 freight cars for export, 535 passenger cars for domestic use and 40 for foreign shipment were built, a total of 62,417, compared with 50,914 in the corresponding period last year, divided as follows: 47,577 freight cars for domestic use and 2585 for foreign shipment, 684 passenger cars for domestic roads and 68 for foreign shipment.

Chicago Great Western has ordered 500 all-steel box cars from Pullman Car & Mfg. Corpn.

Maine Central has ordered five 70-ton hopper cars from Standard Steel Car Co.

United Fruit Co. is inquiring for 55 fruit cars.

Coos Bay Lumber Co., Powers, Ore., is in the market for one 2-8-2 type locomotive.

Indiana Sets Aside Higher Freight Rates on Steel

An order permanently setting aside increased iron and steel rates prescribed for Indiana by the Interstate Commerce Commission has been adopted by the Indiana Public Service Commission. The commission contends that the railroads have not complied with the Indiana public utility law by proving that the proposed higher rates on iron and steel are reasonable.

A new schedule on iron and steel rates was published early this year by the railroads under authority given by the Interstate Commerce Commission to make increases effective on May 20. After a hearing on a petition by the Indiana State Chamber of Commerce, the Indiana commission ordered the rates temporarily suspended. The recent action was to make the earlier order permanent.

The Indiana commission in the same order reduced rates on iron bars from the Terre Haute district to Chicago from 20½c. to 15c.

Plan Machinery Research

Machine Tool Builders Decide to Study Markets for Their Products

C. A. Johnson, president, Gisholt Machine Co., Madison, Wis., was re-elected president of the National Machine Tool Builders' Association at the annual meeting at Lenox, Mass., Oct. 14. R. M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill., was chosen first vice-president, and C. R. Burt, president, Pratt & Whitney Co., Hartford, Conn., is second vice-president. G. E. Randles, president, Foote-Burt Co., Cleveland, is treasurer.

New directors are H. S. Beal, assistant general manager, Jones & Lamson Machine Co., Springfield, Vt.; F. H. Chapin, president, National Acme Co., Cleveland, and R. A. Heald, secretary, Heald Machine Co., Worcester, Mass.

An address by F. V. Geier, vice-president, Cincinnati Milling Machine Co., Cincinnati, on "Marketing, the Next Forward Step for the Association," was an outstanding contribution to the convention.

Recommendations of the board of directors relating to a program of marketing research to be financed from exposition funds were adopted. The plan includes establishment of a marketing research committee and a research director to work with the association staff.

Eighteen companies have been admitted to membership since the last meeting, while only two have resigned.

Reinforcing Steel

Highway Bridges in Kentucky Will Take 1420 Tons

REINFORCING steel awards the past week were light, totaling only 3900 tons. The State of Kentucky has let 1420 tons for highway bridges in seven towns, and 800 tons will be used in a ramp from Riverside Drive to the Fort Lee bridge, New York. New projects call for 2400 tons, of which 700 tons is for a factory building at Camden, N. J., for the Campbell Soup Co. Awards follow:

NEW YORK, 800 tons, ramp from Riverside Drive to Fort Lee bridge; placed by William P. McGarry Co., Brooklyn, with Igoe Brothers.

JERSEY CITY, N. J., 300 tons, Connelly Avenue bridge, to Igoe Brothers.

EAST ORANGE, N. J., 100 tons, telephone building, to Joseph T. Ryerson & Son.

ATTICA, N. Y., 170 tons, cell block for State prison, to Truscon Steel Co.

PADUCAH, KY., 250 tons, superstructure for bridge, to International Steel & Iron Co., Evansville, Ind.

SMITHLAND, KY., 153 tons, bridge superstructure, to Nashville Bridge Co.

SPOTTSVILLE, KY., 288 tons, bridge; 123 tons for substructure to Koss Construction Co., Des Moines, Iowa, 165 tons for superstructure to International Steel & Iron Co.

BOONESBORO, KY., 204 tons, bridge, to J. A. Kries & Son, Louisville.

TYRONE, KY., 148 tons, bridge, to Henry Bichell Co., Louisville.

EGGNER'S FERRY, KY., 185 tons, bridge, to Vincennes Bridge Co.

CANTON, KY., 183 tons, bridge, to Nashville Bridge Co.

CHICAGO HEIGHTS, ILL., 265 tons, school, to Inland Steel Co.

SIOUX CITY, IOWA, 150 tons, warehouse, to Calumet Steel Co.

DESPLAINES, ILL., 200 tons, bridge, to American System of Reinforcing.

ST. LOUIS, unstated tonnage, *Globe-Democrat* building, to Laclede Steel Co.

SAN FRANCISCO, 500 tons, additional, San Francisco Ball Park, to Pacific Coast Steel Corpn.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 210 tons, Institute for Crippled and Disabled Children; contract for concrete work taken by Industrial Engineering Co., New York.

CAMDEN, N. J., 700 tons, factory for Campbell Soup Co.

BUFFALO, 200 tons, school No. 64.

PITTSBURGH, 500 tons, medical building on Fifth Avenue; E. T. Riffle, general contractor.

CHICAGO, 150 tons, Randolph Street viaduct.

DAVENPORT, IOWA, 500 tons, theater and office building; A. S. Craven, Chicago, architect.

LOS ANGELES, 150 tons, apartment building, 714 Mariposa Avenue; bids being taken.

General Motors May Buy Martin-Parry Plant

The General Motors Corpn. is planning to manufacture a complete line of bodies for its commercial cars and is negotiating to acquire for that purpose the Indianapolis plant and assembling branches of the Martin-Parry Corpn. The announcement was made Tuesday by John J. Watson, chairman of the Martin-Parry board. For the last two years General Motors has been one of the largest customers of Martin-Parry.

Sales of mechanical stokers in August were 115 units with 29,988 hp., compared with 150 with 37,761 hp., in July, according to reports received by the Department of Commerce from the 11 leading manufacturers. In the first eight months of the current year 835 stokers, with 251,660 hp., were sold, against 1197 with 413,347 hp., in the corresponding period of 1929.

Automobile Output for Year Estimated at 3,500,000 Cars

DETROIT, Oct. 13.

AUTOMOBILE production in September was somewhat higher than the industry anticipated, the result being that Detroit is in a better frame of mind.

The Ford Motor Co. announced that its output last month was 97,885 units, compared with 99,142 in August. Those who wonder at this showing, in view of the fact that the Rouge plant operated part of the month on a schedule of three days a week, should bear in mind that Ford activities cannot be entirely gaged by the schedule at Dearborn. Sometimes an upward or downward trend depends on the program of branch assembly plants. The Rouge division may manufacture stocks of parts and then reduce its activities, but during the curtailment period production elsewhere may have been accelerated. While Ford's October assemblies probably not be as large as its September record, it is safe to say that they will be greater than some predictions have put them.

Another bit of interesting news the past week was the estimate of the National Automobile Chamber of Commerce that September output of cars and trucks in the United States and Canada was 226,361 units, a decrease of only 3 per cent from August. For the first nine months of 1930, production is estimated at 3,061,983 units, or a drop of 37 per cent from last year and 10 per cent from the five-year average. Since some observers had placed September figures under 200,000, the conclusions of the chamber, based on shipping reports from members, put to rest the talk that the industry had restricted its output to an alarming extent.

Production for the entire year is now placed at 3,500,000 to 3,600,000 cars and trucks. This is based on the assumption that the October rate will be approximately equal to last month's and that there will be some seasonal falling off in November and December, especially in the last two weeks of the year.

Alfred P. Sloan, Jr., is reputed to have said that General Motors will build about 1,200,000 cars this year. Ford's output will run close to 1,600,000. If the year's total for all companies is 3,500,000 to 3,600,000, which seems likely, it can be seen that Ford and General Motors together will make nearly 80 per cent of the cars manufactured. Ford has just announced a reduction in the price of tractors from $750 to $675 to bring it in line with recent decreases in the company's passenger car and truck schedules.

September automobile output in United States and Canada estimated at 226,361 units, or 3 per cent less than that of August.

* * *

1930 production of passenger cars and trucks probably will be 3,500,000 to 3,600,000 units. Of this amount Ford and General Motors will build close to 2,800,000.

* * *

Automobile industry does not expect boom in 1931, but does look for output of more than 4,000,000 cars with 4,500,000 as maximum.

* * *

Ford's Rouge plant is still operating three days a week. Chevrolet is adhering to heavy production program. October showing for the industry probably will equal September rate.

Next Year's Output Estimated at 4,000,000 to 4,500,000

SEVERAL agencies are now indulging in prophecies regarding the trend of automobile manufacture in 1931. In some cases they are putting much faith in the argument that the demand for replacements, now being held back by the conservatism of the buying public, will be unusually heavy and will make up to some extent for the less-than-average purchases this year. As a matter of fact, men who have been in the automobile industry over a long period do not look for a boom next year. Experience in the months following other depressions points to a slow recovery; therefore, they are counting on an output of somewhat more than 4,000,000 cars, with a possible maximum of 4,500,000.

Scrapping Old Cars

The placing of an order by the Ford Motor Co. for a 400-ton furnace in which old cars will be melted calls attention to the pioneering work which the company is doing in getting obsolete models off the market. It would not be surprising if the scrapping program at the Rouge plant reaches the point where some 2000 cars will be broken up and the metal recovered every working day. The ideal of the industry, of course, is eventually to scrap as many cars as are manufactured. The present program of Ford and other makers is doing much to clear up the troublesome problem of having the market cluttered with used and in most cases obsolete cars.

Nash Reduces Prices

Appearance of the four new lines of Nash cars the past week focused attention again on recent slashes in retail prices. The new six, with a wheelbase of 114¼ in., is selling at $795 to $845 f.o.b. factory, a reduction of $140 to $160 from last year's schedule. The new eight-70, with a wheelbase 2 in. longer than the old six, is priced at $955 to $995, or at almost the same level as the former six. The eight-80, having a wheelbase of 121 in., is $110 to $120 less than the twin-ignition six of 1929. The largest difference in prices is noted in the twin-ignition eight-90. With a wheelbase of 124 to 133 in., the same as last year's twin-ignition eight, it is being sold at $180 to $360 below the old eight. Its schedule ranges from $1,565 to $2,025. Other makers who have reduced prices materially are Studebaker, Buick, Cadillac, Packard, Oakland, Pontiac, Hudson and Essex.

All-Steel Bodies Opposed by Lumber Interests

A CHANGE in materials going into the construction of a product sometimes carries with it strenuous opposition on the part of the makers of displaced materials. An apt illustration of this is the case of a Detroit automobile manufacturer who substituted an all-steel body for wood. Objections were raised by the lumber interests, who tried to set up a boycott of the company's cars as punishment. Numerous letters were received from lumber companies, but the automobile maker patiently explained his position, pointing out that it would be futile for him to stand still when others were going forward. The inevitable trend, as a matter of safety and durability, is toward all-steel bodies, he pointed out, and his refusal to accept the new situation would be of as little avail as efforts to halt the advance in further mechanizing industry.

Rustless Steel Making Rapid Progress

Rustless steel is destined to become of increasing use in the automobile

industry. As everyone knows, its chief advocate is the Ford Motor Co., which is said to have achieved some astonishing results with it in the form of low production costs. Ford is reported this year to be taking more tonnage than was produced in the entire year 1929. It would not occasion surprise if the amount of rustless steel consumed by Ford in 1931 would show a considerable gain over the total for the current year. While mass production at the Rouge plant has enabled Ford to go in for rustless steel on an extensive scale, its high cost compared with chromium plating and other finishes has made it necessary for other manufacturers to stand by, proceeding slowly in adopting it. A few new parts on the coming Chevrolet are reported to be of rustless steel. Aside from Ford, the largest user is said to be the Chrysler Corporation, the new Chrysler having some 15 rustless steel parts. The steel people are watching developments closely and are ready to convert present mills to the production of additional tonnage as soon as consumption justifies this step.

Pig Iron Shipments Better This Month

STEEL mill operations in this district have changed little. The Great Lakes Steel Corpn. is operating two open-hearths, which are taking hot metal from the Hanna furnace at Zug Island, and is running its strip mill. The Michigan Steel Corpn. is rapidly bringing to completion its rearrangement of manufacturing facilities at its Ecorse, Mich., sheet mills, thereby increasing its monthly capacity to 30,000 tons.

Foundries outside the automobile industry, especially those making stove castings, have shown improvement, so that October pig iron shipments are likely to be slightly larger than those of September. During a period when business from automobile factories has been distressingly low, some foundries have been able to diversify their products to such an extent that they have not felt the loss so severely as others. A good example is a large gray iron foundry outside Detroit which is turning out gas engines for industrial purposes. This line has fitted in nicely this year and has marked the difference between a sizable loss and actual small profits.

Beginning Nov. 1, the entire line of "Gredag" lubricants manufactured by the Acheson Graphite Corpn., a unit of the Union Carbide & Carbon Corpn., will be distributed and sold by the carbon sales division of National Carbon Co., Inc., with headquarters at Cleveland. The carbon sales division of National Carbon Co. has been active for many years in the sales and distribution of carbon, graphite and metal graphite brushes, illuminating carbons, welding carbons and numerous carbon specialties.

Protest Uniform Freight Rate Change on Scrap

A protest has been filed with the Interstate Commerce Commission in behalf of producers, consumers of scrap, and the scrap iron industry against the establishment of a uniform basis for determining freight rates on scrap iron and steel at this time. The petition was prepared at a conference of leading interests held in Pittsburgh on Oct. 7. The protest was specifically directed against the report of the examiner in Docket No. 20583, known as the Kokomo case, in which the examiner recommended that rates on scrap iron to Kokomo be set at 70 per cent of the mileage scale of finished steel products, and at the same time recommended that the same basis be applied throughout the Central Freight Association territory.

It was the position of the Pittsburgh conference that such a general recommendation at this time would disturb the sources of supply of consumers of scrap and would prevent the free flow of scrap to the steel industry. The conference was not prepared to commit itself on a mileage scale for scrap iron or on any basis that would relate scrap to finished steel products. It was the consensus of opinion that each case should be decided on its merits and that inequalities which may exist in the present rate structure should be adjusted, without disturbing the entire rate structure.

The committee that drafted the resolution to the Interstate Commerce Commission consisted of W. J. Hammond, Inland Steel Co.; R. K. Keas, Laclede Steel Co., and Benjamin Schwartz, director general, Institute of Scrap Iron and Steel. In addition to the above, representatives of the following companies signed the petition: Illinois Steel Co., Weirton Steel Co., American Rolling Mill Co., Wheeling Steel Corpn., Carnegie Steel Co., Chamber of Commerce of Pittsburgh, Republic Steel Corpn., Youngstown Sheet & Tube Co., Otis Steel Co., National Automobile Chamber of Commerce, Detroit Board of Commerce, and Youngstown Chamber of Commerce. M. N. Billings, Illinois Steel Co., was chairman of the conference committee.

The memorandum to the Interstate Commerce Commission states in part:

"There is available each year in this country in the neighborhood of 30,000,000 tons of scrap iron and steel. It is respectfully submitted that any disruption of the general rate structure without full consideration of all facts, including the peculiar marketing characteristics of this commodity, would ultimately prevent its free flow, and the full conservation of natural resources, such as iron ore, coal, etc., which will result from the use of this waste and by-product of American industry.

"Scrap iron and steel is collected, prepared and distributed through well-defined channels which are exceedingly sensitive to the law of supply and demand, and many factors, particularly the freight rate structure, which are not evident with relation to other commodities.

"The machinery for collection, preparation and distribution of scrap iron and steel employs over 200,000 people who depend upon it for livelihood, and any widespread change in a general rate structure, based upon any opinion which goes beyond the facts clearly evident in any particular case, would seriously affect the industry.

"The scrap rate structure has been built up by the commercial requirements of the steel industry, and, in our opinion, this principle, insuring its free movement, is fundamentally sound and meets the needs of the industry. We recognize that certain inequalities exist; these should be adjusted on their individual merits."

Steel Fabricators to Meet at Pinehurst, Oct. 28-31

The American Institute of Steel Construction will devote most of the time at its annual convention at Pinehurst, N. C., Oct. 28 to 31, on problems directly concerning the use of structural steel. The program includes the following features: Address by R. I. Ingalls, president, Ingalls Iron Works Co., Birmingham, on "The Structural Steel Industry and Its Future Possibilities"; an address by J. G. Shryock, chief engineer, Belmont Iron Works, Philadelphia, on "Why Structural Steel Should Be Nationally Advertised"; address by T. W. Dodd, president, St. Joseph Structural Steel Co., St. Joseph, Mo., on "Economics of Highway Bridge Construction." Also included are: "What I Saw and Heard in Europe," by George Pistor, Hay Foundry & Iron Works, New York; "Promoting Steel Consumption in Germany," by Otto von Halem, director German association for promoting the use of steel, and "The Value of Research Being Conducted by the Trade Promotion Bureau of the United States Steel Corpn. and Its Relation to the Work of the Institute," by C. O. Hadly, secretary of the Steel Corporation's trade research bureau.

James A. Farrell, president, and E. P. Thomas, vice-president, United States Steel Corpn., and E. W. Beatty, president, Canadian Pacific Railway Co., will be speakers at the banquet to be held Thursday evening, Oct. 30. The convention will conclude with a Hallowe'en party Friday evening, Oct. 31, at which L. L. Gadd, vice-president, Levering & Garrigues Co., New York, will be toastmaster. Charles N. Fitts, president of the institute, will be toastmaster at the banquet Thursday.

In its article on the new Canadian tariff, page 888, THE IRON AGE of Sept. 25, erroneously stated that Canada has a commercial treaty with Germany.

Farmers Will Turn to Machinery to Cut Production Costs, Makers Say

CONSENSUS of opinion at the thirty-seventh annual convention of the National Association of Farm Equipment Manufacturers, held Oct. 8-10 at Chicago, was that the farmer, intensely interested in reduction of cost, is eagerly turning to the use of machinery, and this fact gives assurance that the future of the farm equipment business is secure. Much thought was given to the subject of bankers' aid in retail implement distribution.

The farmer today appears to have about the same ability to purchase as in 1921, according to observations by A. E. McKinstry, International Harvester Co., president of the association. He went on to say that the farmer is in a much better frame of mind with regard to farm equipment than he was in the previous depression. Further, when the farmer is able to get back into the market for the equipment he needs he will do so more speedily and strongly than he has done in the past.

The reason for the marked difference between the attitude of the farmer today toward the farm equipment industry from what it was in 1921 is the better understanding he has acquired during the last 10 years about the part good farm equipment plays in profitable farm operation. Proof has been piled on proof to show that nothing the farmer bought was so cheap as his farm operating equipment, and that nothing he could buy offered him any such prospect of winning something more than a bare living from his acreage.

Inventories Are in Satisfactory Condition

From 1922 until a short time ago both agriculture and the farm equipment industry were slowly but steadily gaining ground. The market for improved equipment was becoming more and more receptive as farmers realized the vital importance of using the most efficient implements the industry could provide. Under the stimulus of an increasing demand for better implements, engineers and factories pushed ahead more aggressively than ever before. New machines, new models and types of earlier implements, more speed, more power and more productive efficiency per pound of weight and per dollar of cost—these things were the farm equipment maker's contribution to the return of farm prosperity.

Mr. McKinstry finds that the greatest difference between today and 1920-21 is in the inventory situation. Then the industry was confronted with heavy inventories of high-cost goods and high-priced materials. Today the inventory situation is relatively good as compared with 1920-21.

H. G. NEWCOMER

Ultra-optimists and pessimists are placed in the same category by Charles Deere Wiman, president, Deere & Co., who believes they are both prone to exaggerate. Droughts, blight and business depressions have gripped the country in the past, but during all of this time the farm equipment industry continued to grow and it should continue to grow vigorously in these modern times when the economic system is under better regulation. It seems logical, he said, to assume that, since the industry was successful in the years of the pioneers when farming was a job, not a business, then the industry can look forward to much greater successes in these years when farming is an intricate business with large investments—a business in which economy and efficiency demand more and more of the advantages of labor-saving, cost-reducing machinery.

Profits Narrowed by High Costs

Denial that farmers are prevented from making profits because they are producing surpluses was made by Wheeler McMillen, associate editor, the *Country Home*. He believes the profits of too many farmers are being narrowed by their high cost of production. Surpluses of course exist, but they do not prevent profits for low-cost farmers.

The average producer, or any producer, can exert little or no effect upon the prices of staples. As a matter of fact, the cost of production has no direct relationship with price. A market seems always to be found, some place at some price, for all the non-perishable staples of agricultural production. The purchasing power of peoples, especially abroad, imposes limits upon the prices that can be paid, limits often far below their desires to consume. Surpluses result, not from the world's inability to consume, but from inability to buy at prices which have been necessary to provide fair profits for the higher cost producers. Our purpose, therefore, must be to spread our demonstrated low costs among so many farmers that agriculture will have an adequate net profit after selling at what the world can afford to pay. Therefore, an intelligent attack must be made on high cost of production.

Low Costs Will Solve Surpluses

When low costs become sufficiently general, surpluses will be forgotten, even though farmers grow as great or larger quantities. So far as it is sound and practicable to adjust production to demand, to substitute more profitable crops for less profitable products, it is desirable to do so. However, restriction of production should not be carried to such a point as to surrender our position in the world's markets; certainly not when our agriculture has the brains, the competence, and the means to compete successfully. Infinitely more research is needed to extend markets, to create new uses for the soil's output, and to accomplish more economical distribution.

H. G. Newcomer Elected President

The following officers were elected: H. G. Newcomer, Eureka Mower Co., Utica, N. Y., president; Daniel Seltzer, Ohio Cultivator Co., Bellevue, Ohio, executive chairman; H. S. Lord, vice-president, Hart-Carter Co., Peoria, Ill., vice-president; and J. R. Tranter, secretary and general manager, Hardie Mfg. Co., Hudson, Mich., vice-president. William Butterworth, president, United States Chamber of Commerce, and chairman of the board of Deere & Co., and Alexander Legge, chairman Federal Farm Board, were made honorary life members of the association.

▲▲▲ PERSONALS ▲▲▲

JAMES E. LOSE, assistant general superintendent at Homestead, Pa., works, Carnegie Steel Co., Pittsburgh, has been appointed general superintendent at that plant, succeeding RALPH H. WATSON, who was made vice-president of the Carnegie company on Sept. 1. Mr. Lose has been succeeded by WILLIAM S. UNGER, who has been superintendent of Carrie

J. E. Lose

Furnaces at Rankin, Pa. Mr. Unger's position has been taken by CHESTER P. CLINGERMAN, recently superintendent of blast furnaces at Mingo Junction, Ohio. JOHN W. MCGRADY, production manager at Homestead works, has also been made assistant general superintendent in charge of producing departments. FRED E. KLING, chief engineer in Carnegie's Youngstown district, has been made chief engineer for the entire company, succeeding SIDNEY DILLON, who recently became assistant to the president.

James E. Lose was born in Kansas in 1891 and received his college engineering training at Carnegie Institute of Technology, Pittsburgh. He went with the Carnegie Steel Co. in January, 1910, as tracer in the drafting room at Carrie furnaces, and served successively as draftsman, stock house foreman, superintendent of structures, assistant superintendent of blast furnaces, and superintendent of Carrie furnaces.

William S. Unger, the new assistant superintendent at Homestead, was born at Braddock, Pa., in 1893, and was graduated from Cornell University in 1916. He entered the Carnegie company as a student in the Homestead works immediately after graduation and has served consecutively as pyrometer man at Duquesne blast furnaces, assistant superintendent of Clairton blast furnaces, and assistant superintendent of Carrie furnaces.

Chester P. Clingerman, the new superintendent of Carrie furnaces, was born at Altoona, Pa., in 1884, and was graduated from Lehigh University in 1906. He went to work immediately as recorder in the merchant mills at Duquesne works of Carnegie Steel Co., and the following year went to National works of the National Tube Co. as draftsman and later as master mechanic. He returned in 1909 to Duquesne works, where he served in the blast furnace department. From 1915 to 1917 Mr. Clingerman was identified with the Bethlehem Steel Co. at Sparrows Point, Md., later returning to Carnegie as assistant superintendent of blast furnaces at Bellaire, Ohio. He later became assistant superintendent of both the Bellaire and Mingo Junction furnaces, and in 1926 became superintendent of Mingo furnaces.

John W. McGrady, assistant general superintendent of Homestead works in charge of the producing departments, was born in Pittsburgh in 1871, and attended the Curry Business College in that city. He went with the Carnegie company in 1894 as inspector on the 23-in. mill at Homestead works, and has served successively as testing machine operator at that plant, chief inspector at the Twenty-ninth Street mills in Pittsburgh, assistant and chief inspector at Homestead, and manager of the production department.

C. A. Thayer, as mentioned in this column, Oct. 9, is now chief engineer of the Republic Steel Corpn., with headquarters at Youngstown.

Fred E. Kling, now chief engineer of the Carnegie Steel Co., was born at Westhofen, Germany, in 1878, and attended the Royal Engineering College at Dortmund, Germany. He entered the steel industry as a draftsman for the Carnegie company in 1902, and in the Youngstown district has served as chief draftsman and chief engineer.

W. S. Unger

LESTER N. SELIG, formerly assistant to the president of the General American Tank Car Corpn., has been elected president, to succeed ELIAS MAYER, who resigned recently. Mr. Selig was graduated from Brooklyn Law School, after which he entered the service of the General American Tank Corpn., Warren, Ohio, in 1914. He has been with the company through its various shops and in various positions since that time.

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B. L. DONOHUE, for the past eight years in the Pittsburgh office of Cutler-Hammer, Inc., has become manager of the Buffalo district office of the company. He succeeds B. A. HANSEN, who has resigned.

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ALAN H. HARRIS, of the Pittsburgh sales department of the Koppers Construction Co., has been appointed Chicago district engineer, succeeding WALTER F. MUNNIKHUYSEN, who has become manager of the Connecticut Coke Co.

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STANLEY S. BOYER has been elected president and general manager of the Herbrand Co., Fremont, Ohio, and RICHARD O. MEAD has become vice-president.

R. A. SCHOENFELD, for the past seven years sales manager of the Claud S. Gordon Co., Chicago, has been made sales engineer, with headquarters in the Chicago district office, of the Hevi Duty Electric Co., Milwaukee.

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THOMAS R. HEYWARD, JR., of the Duraloy Co., Pittsburgh, has been appointed chairman of the newly organized heat-corrosion-resistant alloy founders division of the Steel Founders' Society of America.

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STANLEY M. TRACY, treasurer of the Driver-Harris Co., Harrison, N. J., was tendered a dinner on Oct. 9 by his associates in celebration of 20 years of service with the company. He started as office manager of the American Wire Cloth Co., a subsidiary, and was elected treasurer and a director in 1922.

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E. A. WILCOX has been appointed representative in California, with offices at 273 Seventh Street, San Francisco, for the Hoskins Mfg. Co., Detroit.

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L. W. KEMPF, of the Aluminum Co. of America Research Laboratories, will address the Worcester, Mass., chapter of the American Society for Steel Treating, Oct. 16, on "Progress in Aluminum."

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EDWIN B. GEORGE, formerly manager of the Philadelphia district office of the Bureau of Foreign and Domestic Commerce, has been made chief of the recently established marketing service division of the bureau.

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L. E. L. THOMAS, vice-president, Freyn Engineering Co., returned on Oct. 4 from Leningrad, U. S. S. R., where he has been for the past 18 months, in connection with consulting services that company is rendering to the Soviet iron and steel industry. He is returning to Leningrad early in November.

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A. M. SHELDON has been elected president of the Union Special Machine Co., Chicago, succeeding the late Parker S. North. Mr. Sheldon has been vice-president and general manager of the company since 1926.

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A. G. J. RAPP, engineer with the National Engineering Co., Chicago, maker of sand mixers and foundry sand-handling equipment, will speak on "The Importance of Proper Sand Preparation in Sand-Handling Systems" at a meeting of the Pittsburgh Foundrymen's Association, to be held in room 104 of the College of Industries, Carnegie Institute of Technology, Pittsburgh, on Oct. 20 at 8 p.m.

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JOHN S. OURSLER, who recently resigned as vice-president of the Carnegie Steel Co., Pittsburgh, has gone to California, where he expects to make his permanent home.

OBITUARY

CARL AUGUST MEISSNER, who achieved recognition when barely 35 years of age as an expert on the blast furnace and who for years has served as chairman of the committees of the United States Steel Corpn. devoted to blast furnace, open-hearth furnace, coke ovens and limestone practice,

C. A. Meissner

died suddenly at Steubenville, Ohio, Oct. 13. He was a conspicuous member of the steel industry, to which he made a number of valuable contributions, including a complete revision, in collaboration with J. A. Mohr, of Forsythe's "The Blast Furnace and the Manufacture of Pig Iron."

Mr. Meissner was born at Staten Island, New York, on Sept. 29, 1859, and was graduated as a chemist from School of Mines, Columbia College, in 1880, when he began his active career as assistant chemist for the Joliet Steel Co. The following year he became chemist and assistant superintendent of the Brier Hill Iron & Coal Co., Youngstown. In 1884 he returned to the Joliet Steel Co. as chief chemist, leaving that position in 1887 to become general manager of the Sterling Iron & Railway Co., Sterlington, N. Y. Two years later he identified himself as vice-president and general manager with the Vanderbilt Steel & Iron Co., Birmingham. From 1895 to 1899 he was general manager of the Londonderry Iron Co., Londonderry, Nova Scotia, Canada. He then became manager of the mineral department and acting assistant general superintendent of the Dominion Iron & Steel Co., Ltd., Sydney, Cape Breton, Canada, and held this position until 1904, when he was made assistant to the executive of the Canada Iron Co., Ltd., and Londonderry Iron & Mining Co., Montreal. The following year he resigned this position to join the United States Steel Corpn. He gave up active work as technical assistant to President Farrell several months ago. Four sons are all identified with the steel and engineering industries: Charles R. Meissner, as superintendent coke plant, Weirton Steel Co.; Charles E. Meissner, sales manager, Chrome Steel Corpn.; Harold G. Meissner, sales engineer, Riley Stoker Co., and James A. Meissner, blast furnace superintendent, Ensley furnace, Tennessee Coal, Iron & Railroad Co.

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H. THOMAS OLIVER, general superintendent, National Equipment Co., Springfield, Mass., died at his home in that city on Oct. 13, aged 46 years.

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ARMIN O. KUEHMSTED, vice-president, Gregory Electric Co., Chicago, died on Oct. 8. He was born in Oshkosh, Wis., in 1863 and went to Chicago in 1890, where he resided until the time of his death.

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EUGENE F. BOWEN, since 1927 secretary and treasurer of the Allen Wrench & Tool Co., Providence, R. I., died recently, aged 75 years.

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JOHN CURRY CHAPMAN, factory manager, Whitney Mfg. Co., Hartford, Conn., died suddenly of heart failure on Oct. 7. Before associating himself with the Whitney Mfg. Co. about 12 years ago, Mr. Chapman was with the Colt's Patent Fire Arms Mfg. Co. and with the Pratt & Whitney Co. He was a native of England.

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THOMAS J. KELLEY, for the past 18 years manager of the Manufacturers Association of Hartford County, Conn., died at his home in West Hartford on Oct. 6, aged 63 years.

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THOMAS WATSON GRIGGS, vice-president, Davenport Machine & Foundry Co., Davenport, Iowa, died in that city Oct. 1, following an operation. He was 55 years old.

Trackwork Shipments in Heavy Slump

Shipments of trackwork for T-rail track of 60 lb. and heavier amounted, in September, to only 5642 net tons—the smallest total since these figures have been compiled. This was less than one-half the volume of September, 1929, at 12,962 tons, and was 17 per cent below the 6812 tons of August. There has been a steady drop since April, the high month of the year, when 13,508 tons was shipped.

In nine months shipments have been 95,539 tons—again the smallest ever recorded. Last year 127,061 tons was shipped in nine months.

Machine Tool Markets Are Still Dull

Failure of General Business To Pick Up Acts As Check on Sales

WHILE it is generally believed that the low point of the depression in machine tool business was passed about Sept. 1, the improvement since that time has been very small.

Disappointment that general business has failed to reflect much seasonal expansion has brought renewed evidences of sales resistance on the part of buyers who were about ready to place orders a month or so ago, when there appeared to be signs of a fall uptrend.

The present situation offers little encouragement for the remainder of the year, and opinion is quite general that no marked improvement in machine tool business can now be expected before spring.

There is a good deal of prospective business in the market, but machine tool salesmen experience difficulty in getting the orders. A Cincinnati machine tool builder recently made a check up of recent inquiries and found that only about 10 per cent resulted in orders.

The Cleveland Tractor Co., Cleveland, has bought a number of machines. A company in the New York district is inquiring for five lathes. The Chicago Board of Education will readvertise for bids on 18 lathes.

New York

Signs of business improvement that will have a favorable effect on sales of machine tools are hard to find. The fact that the expected seasonal gains have not materialized has brought a fresh feeling of disappointment, which has increased the sales resistance that machine tool agencies have been experiencing for some months. Orders in the past week were at about the level of the two or three weeks immediately preceding. Some dealers report that the week brought a little more inquiry, mostly for single machines, with one for five lathes.

While the low point of machine tool business probably was passed about Sept. 1, the increase since that time has not been large. Opinion is quite general that there will be no marked improvement before spring.

Cincinnati

The machine tool market is quiet and featureless. Demand is low, although inquiry continues in fair volume. A check-up by a local manufacturer indicates that only about 10 per cent of recent inquiries produced orders. Buyers pursue a policy of retrenchment and are not willing to purchase new equipment until general business improves. Production continues at a low rate, with many manufacturers still alternating working weeks or reducing hours.

Chicago

Dullness in this market still prevails. Most railroad shops in the West are operating at the lowest schedules in several years, and job work which appeared to be on the increase early this month is not gaining. The Chicago Board of Education will readvertise for 18 lathes which were included on an old list. Construction work on the Lane Technical High School is on schedule and it is probable that by March, 1931, the school board will be ready to buy equipment. Several new inquiries for lathes have come from manufacturers at Rockford, Ill.

Cleveland

Machine tool sales this month are lighter in volume than in September, and as inquiry is scarce there is little encouragement in the situation. Quite a few inquiries that have come into the market recently are still pending, prospective purchasers withholding the placing of orders until business picks up. The Cleveland Tractor Co. purchased several machines the past week, but, with that exception, orders were confined to single tools. Local metal-working plants were operating at slightly lower capacity Oct. 1 than at the beginning of September. The outlook for the remainder of the year is not promising.

Pittsburgh

The machinery market in this district has been considerably quieter so far this month than it was in September. New inquiry, which was fairly active last month, is no longer worthy of note, and action is very slow on prospective business previously announced. The Jones & Laughlin Steel Corpn. is still making some purchases for both its Pittsburgh and Aliquippa, Pa., works in connection with a betterment program now in progress, and the Westinghouse Electric & Mfg. Co. is buying a few tools. Since the latter company has discarded its policy of buying tools quarterly, some are placed each month.

The market on steel mill equipment and machinery is dull, although plants in this district are booked well into the new year on business taken during the spring and summer.

New England

It is said that the consensus of opinion of members of the Associated Machine Tool Dealers, who met last week at Lenox, Mass., was that there will be no material improvement in business until early next year. This opinion is shared by the machine tool trade here.

Boston has closed bids on a small motor-driven lathe and two bench grinders and on Oct. 14 will close bids for woodworking machinery. Recent used tool sales include a fairly large shear, a 24-in. tool room lathe and several small drilling tools.

Milwaukee

The recent slight improvement in machine tool business justifies hopes that the month will witness a fair volume of bookings. The Wrought Washer Mfg. Co. will proceed at once with the $500,000 plant replacement project made public last spring, but delayed somewhat by uncertain business trends. While few other important industrial expansions are in the immediate foreground, inquiries are being made on a considerable number of plant enlargement programs of moderate size. Used tool business is only fair, buyers as a rule seeking the latest types of labor-saving equipment to replace more or less obsolete machines.

New York

BIDS will soon be asked by Continental Can Co., 1 Pershing Square, New York, for six-story plant, 129 x 339 ft., at Camden, N. J., primarily for manufacture of tin cans for Campbell Soup Co., to cost about $1,500,000 with machinery. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

Wheeler Paper Corp., Albany, N. Y., recently organized by Thomas B. Wheeler, formerly identified with A. P. W. Paper Co., with local mill, has leased part of building on Tivoli Street, totaling about 20,000 sq. ft., and will establish new mill for manufacture of paper products.

Atlas Safety Lock Co., 215 Seventh Avenue, New York, has leased building at 838-40 Greenwich Street, and will remodel for new factory and remove to new location.

Signal Supply Office, Army Base, Brooklyn, is asking bids until Oct. 28 for 15 wind-driven generators; until Oct. 30 for 14 d. c. motors.

Warner-Quinlan Co., 2 Park Avenue, New York, will soon take bids for two-story automobile service, repair and garage building in Long Island City for company motor trucks, to cost over $150,000 with equipment. It is planned to build a similar smaller two-story unit at Richmond Hill, L. I.

Consolidated Gas Co., 4 Irving Place, New York, plans early call for bids on general contract for three-story equipment, service and repair works, 100 x 100 ft., to cost over $250,000 with equipment.

Anaconda Wire & Cable Co., 25 Broadway, New York, a subsidiary of Anaconda Copper Mining Co., same address, has acquired property at Sycamore, Ill., adjoining wire and cable works recently purchased at that place for future expansion.

Columbia Broadcasting System, Inc., 485 Madison Avenue, New York, has secured a site in Wayne Township, near Paterson, N. J., for a new broadcasting station, including power house, steel towers and other equipment, to cost over $100,000.

New Jersey Power & Light Co., Dover, N. J., has arranged for a bond issue of $2,000,000, part of fund to be used for extensions and improvements in power plants and system.

Proposed new plant of Anheuser-Busch, Inc., 721 Pestlozzi Street, St. Louis, manufacturer of beverages, etc., in New Jersey will be given over to production of yeast and not containers as previously stated. About five acres is being secured at Old Bridge, N. J., and Stone & Webster Engineering Corpn., 120 Broadway, New York, engineer, will prepare plans for initial units, to cost over $1,000,000 with machinery.

National Fire Proofing Co., Keasbey, N. J., contemplates rebuilding two-story machine and forge shop, recently destroyed by fire.

Gatti Paper Stock Corpn., Thirteenth and Monroe Streets, Hoboken, N. J., has asked bids on general contract for two-story plant, 90 x 192 ft., to cost over $75,000 with equipment. C. F. Dieffenbach, 84 Washington Street, Hoboken, is architect.

Biax Flexible Shaft Co. has moved to 22-14 Fortieth Avenue, Long Island City.

Korth Engineering Co., 1139 Tiffany Street, New York, manufacturer of oil burning equipment, is moving to new two-story plant on Hawthorne Street, Roselle, N. J.

A public auction sale of equipment of Pouvailsmith Corp., Poughkeepsie, N. Y., will be held Oct. 22 and 23 by Louis Himoff, auctioneer, 225 Lafayette Street, New York. Machine tools, wood-working machinery, chemical and rubber machines, material and supplies and office equipment will be disposed of; also real estate and buildings.

Buffalo

ARRANGEMENTS have been made by Divco-Detroit Corpn., 2435 Merrick Street, Detroit, manufacturer of automobile equipment, for purchase of Step-N-Drive Truck Corpn., 1255 Niagara Street, Buffalo, manufacturer of automobile delivery equipment. Plants will be continued at Buffalo and Detroit, as heretofore, and expansion carried out. John Nicol is president and general manager of purchasing company.

J. H. Welch Co., Buffalo, has been organized with capital of 500 shares of stock, no par value, to take over and expand contractors' machinery and equipment business of J. H. Welch, 21 Terrace

INDUSTRIAL ACTIVITY

Prospects Revealed by a Survey of Construction Projects

ALTHOUGH the total value of construction projects requiring machinery and other equipment has dipped again this week, totaling about $53,000,000, compared with $68,000,000 a week ago and $86,000,000 two weeks ago, bond issues by large public utilities and oil companies, which reached $44,000,000 a week ago, represent only a minor part of this week's total. The only large future project is $29,650,000 to be expended on seven hydroelectric plants along the Umpqua River in Oregon, if permission is granted by the State to the California Oregon Power Co. This project makes up the greater part of projected building by gas and electric power companies of about $34,000,000.

The oil industry is represented this week by planned expenditures close to $8,000,000, compared with only $2,500,000 a week ago. Included in this total are pipe lines and an oil terminal at East St. Louis, costing $5,000,000, to be built by the Phillips Petroleum Co., St. Louis, $400,000 for a refinery and pipe line at Shreveport, La., for the Standard Oil Co. of Louisiana, and oil storage and distribution plants totaling $3,500,000 in Indiana, Iowa, Oklahoma, Texas, West Virginia, New Jersey and Rhode Island.

Industrial and municipal construction, exclusive of vocational schools, totals close to $12,000,000 this week, of which about $2,500,000 is in expansion of municipal electric and water supply facilities and airport development. Foremost among the airport projects is an $800,000 development at Birmingham. Included in the industrial construction total, metal-working plants and additions total close to $1,000,000, four wood-working plants will cost in excess of $300,000, three large bakeries $650,000 and plants requiring ice or refrigerating machinery $450,000.

Vocational school construction, which a week ago reached $4,000,000 in 21 States, is limited this week to four schools totaling $1,500,000, of which $1,000,000 is for the Lew Wallace school at Gary, Ind.

Street. J. H. Welch and R. C. Weller head new organization.

Fitzgibbon Boiler Works, Oswego, N. Y., has work under way on addition to boiler and plate works for considerable increase in present output.

Department of Correction, State Office Building, Albany, N. Y., plans early call for bids for new shops, storage buildings, mechanical laundry and other structures at Attica, N. Y., State hospital, to cost about $1,000,000 with equipment. State Department of Architecture in charge.

Forest L. Bryant, 62 Bennett Avenue, Binghamton, N. Y., and associates have organized Bryant Refrigerator Equipment Corporation, with capital of $50,000, to operate a local plant for manufacture of electric refrigerator equipment. F. Bertram Bryant will be an official of new company.

South Atlantic

CONTRACT has been let by Bureau of Yards and Docks, Washington, to Mechanical Engineering & Construction Co., Mills Building, for extensions and improvements in brass foundry at local navy yard. Bureau is asking bids until Oct. 29 for a crane runway at local yard; also bids (no closing date stated) for motor-driven pumping machinery for naval air station at Pensacola, Fla.

Arundel Corpn., Pier 2, Pratt Street, Baltimore, has awarded general contract to M. A. Long Co., 10 West Chase Street, for one-story machine shop, 50 x 400 ft., at Fairfield, to replace unit recently destroyed by fire, to cost over $60,000 with equipment.

In connection with rebuilding mill recently destroyed by fire, Santee Heading Corpn., Allendale, S. C., plans installation of motor-driven surface planer, cross-cut saw, sawing machines, rip saw table and other equipment.

Lloyd E. Mitchell, Inc., 915 East Monument Street, Baltimore, heating equipment and supplies, has plans for two-story addition, 60 x 140 ft., part of structure to be equipped as a mechanical shop, to cost about $30,000. Henry G. Perring, Court Square Building, is architect and engineer.

Board of District Commissioners, District Building, Washington, is asking bids until Oct. 22 for steel rolling doors.

Du Pont Cellophane Co., River Road, Buffalo, a subsidiary of E. I. du Pont deNemours & Co., Wilmington, Del., has work nearing completion on initial unit of new mill at Ampthill, near Richmond, Va., for production of moisture-proof wrapping materials, to cost over $3,500,000 with equipment. DuPont Engineering Co., Wilmington, is engineer.

City Council, Aiken, S. C., is considering installation of Diesel engines and auxiliary equipment at municipal waterworks.

Frederick Welch, Charlotte, N. C., has leased a building for new repair and parts manufacturing shop for textile machinery and plans early operation.

City Council, Roanoke, Va., is considering establishment of municipal airport with hangars, repair shop and other field units, to cost over $50,000.

Alabama Coca-Cola Bottling Co., Gurnee Street, Anniston, Ala., plans installation of automatic bottling machinery, capping, conveying and other equipment in one-story and basement plant at Swainsboro, Ga., to cost about $50,000. Pringle & Smith, Norris Building, Atlanta, Ga., are architects.

Lane Co., Altavista, Va., manufacturer of metal reinforced cedar chests, etc., has awarded general contract to Fiske-Carter Construction Co., Spartanburg, S. C., for three-story storage and distributing plant, 100 x 120 ft., to cost about $75,000 with equipment. Lockwood Greene Engineers, Inc., Spartanburg, is architect and engineer. Unit will replace structure recently destroyed by fire.

Southern States Iron Roofing Co., Savannah, Ga., will engage in manufacture of steel barrels. Company is a large maker of galvanized iron turpentine cups, present capacity being about 15,000,000 cups a year. Manufacture of light steel drums has been under way the past few weeks and manufacture of heavy barrels will be started within a month.

Philadelphia

CONTRACT has been let by Pennsylvania Railroad Co., Philadelphia, to Turner Construction Co., Seventeenth and Walnut Streets, for initial unit of abattoir on Grays Ferry Avenue, 36 x 202 ft., with rear extension 202 x 352 ft., to cost $650,000 with equipment. Other units to be built later will cost over $3,500,000 additional. William H. Cookman is company architect.

Officials of Sun Oil Co., 1608 Walnut Street, Philadelphia, have organized Sun Pipe Line Co., a subsidiary, to construct a pipe line from point near Marcus Hook, Pa., where parent company has refinery, to Coatesville, Pa., where two branch lines will be built to Syracuse, N. Y., and Cleveland, respectively. Line will have a daily capacity of 25,000 bbl. of oil and will cost about $5,100,000. New company has arranged for a bond issue of $3,500,000, majority of fund to be used for project. J. Howard Pew, president of parent company, will head new organization.

Ryan, Scully & Co., Wissahickon Avenue and Yelland Street, Philadelphia, manufacturers of furnaces, forges and kindred equipment, have closed bids on general contract for new one-story plant, 50 x 240 ft., to include machine shop, forge shop and furnace division, to cost more than $75,000 with equipment. Eugene A. Stopper, 10 South Eighteenth Street, is architect.

Tinius Olsen Testing Machine Co., 500 North Twelfth Street, Philadelphia, has asked bids on general contract for one-story addition for storage and distribution, to cost over $25,000 with equipment. George S. Idell, Corn Exchange Building, is architect.

Philadelphia Suburban Water Co., Jenkintown, Pa., is disposing of a bond issue of $1,800,000, part of proceeds to be used for extensions and improvements in plants and system.

Department of Supplies and Purchases, City Hall Annex, Philadelphia, Jay Lit, director, will receive bids until Oct. 20 for castings, class 419, and for an asphalt mixer, class 422.

Department of Institution and Agencies, State Office Building, Trenton, N. J., has awarded general contract to General Contracting & Construction Co., 133 East Front Street, for a two-story and basement power plant at Skillman, N. J., to cost about $90,000 with machinery. Charles N. Leathem, Jr., address noted, Division of Architecture and Construction, is architect.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, will soon begin work on an oil storage and distributing plant at Matawan, N. J., to cost over $45,000 with equipment.

Bishop & Babcock Mfg. Co., 4901 East Hamilton Avenue, Cleveland, manufacturer of bottlers' machinery, soda fountain equipment, etc., has leased four-story building at 808 North Broad Street, Philadelphia, for its subsidiary, Bishop & Babcock Sales Corpn., for a factory branch and distributing plant.

Strelz Machine Co., 4500 Wayne Avenue, Philadelphia, manufacturer of textile machinery and parts, has leased three-story building at Germantown, totaling 20,000 sq. ft. floor space, for new plant and will remove to new location.

Philadelphia Hardware & Malleable Iron Works has moved to State Road and Shelmire Street, Tacony, Philadelphia.

Chicago

WORK has been started by Koro Corporation, Waukegan, Ill., manufacturer of wire products, welding rods, etc., on one-story addition, 75 x 200 ft., at Bellwood, to cost about $60,000 with equipment. Arthur U. Gerber, 72 West Adams Street, Chicago, is architect.

Radio Cabinet Co., 1102 South California Avenue, Chicago, plans rebuilding part of plant recently destroyed by fire, with loss over $30,000, including equipment.

Interstate Transit Lines, Inc., Sioux City, Iowa, has leased two-story and basement building, 100 x 150 ft., to be erected by Arthur Sanford & Co., Frances Building, for new motor bus shop and terminal, to cost $150,000 with equipment. Beuttler & Arnold, Insurance Exchange Building, are architects.

W. B. & Leo Harris, 2429 University Avenue, S. E., Minneapolis, road machinery and equipment, have awarded general contract to Madsen Construction Co., National Building, for one and two-story and basement equipment storage and distributing plant, to cost about $60,000. Sund & Dunham, Essex Building, are architects.

Ovens, power equipment, conveying and other machinery will be installed in new three-story and basement plant to be constructed by Pfaff Baking Co., Mason City, Iowa, to cost about $200,000 with equipment. E. L. Stolz is general manager.

Milton R. Spencer, Woodstock, Ill., and associates have organized Woodstock Toy Crafters, Inc., 701 Hay Street, to operate plant for manufacture of mechanical and other toys. W. J. Sylvester, Woodstock, is also interested in company.

Continental Oil Co., Fairfield, Iowa, is planning one-story oil storage and distributing plant, to cost about $40,000 with equipment. Wesley I. Nunn is head.

Board of Water Commissioners, Red Wing, Minn., will receive bids until Oct. 20 for a vertical motor-driven deep-well turbine pump with accessories, for installation in East End pumping plant. L. P. Wolff, St. Paul, Minn., is consulting engineer.

Borden's Farm Products Co. of Illinois, 326 West Madison Street, Chicago, has awarded general contract to Thompson & Son, 30 North LaSalle Street, for one-story automobile service, repair and garage building at Blue Island, Ill., to

cost about $100,000 with equipment. E. E. and E. C. Roberts, 88 West Washington Street, are architects.

City Council, Grundy Center, Iowa, is considering bond issue of $80,000 for a municipal electric light and power plant.

General Water Treatment Corpn. has been incorporated as a holding company to merge Permutit Co. and Ward-Love Pump Corpn., Chicago, both manufacturers of equipment for softening and purification of water. Holding company will have combined assets of more than $4,000,000. W. Spencer Robertson, president of Permutit Co., will be president of General Water Treatment Corpn., and Frances N. Bard, president of Ward-Love Pump Corpn., will be chairman of board of directors.

Detroit

CONTRACT has been let by Benton Harbor Malleable Industries, Inc., Benton Harbor, Mich., to M. W. Stock Construction Co., Benton Harbor, for one-story foundry addition, 90 x 250 ft., to cost over $75,000 with equipment.

Lead Or'Loy Metals, Inc., 2648 East Fort Street, Detroit, recently organized by Fred E. Wissmann and associates, with capital of $25,000, plans operation of local factory for production of lead gaskets, tools, metal stampings and kindred products.

Huron Portland Cement Co., foot of Riopelle Street, Detroit, has awarded general contract to Burrell Engineering & Construction Co., 1 North Canal Street, Chicago, for three-story addition for storage and distribution, to cost close to $45,000 with equipment.

Federal Mogul Corpn., 11031 Shoemaker Street, Detroit, manufacturer of automobile bearings, bushings, etc., will consolidate Federal Bearing & Bushing Corpn., and Muzzy-Lyons Co., manufacturers of kindred products, both same address, affiliated organizations, and will operate under Federal Mogul company name in future.

Peerless Track Co., St. Joseph, Mich., recently organized to manufacture new type of track for Fordson tractors, replacing wheels of ordinary tractor, and other mechanical specialties, has leased former factory of Reliance Elevator Co. for temporary plant. Henry C. Anderson is president and G. B. Paxton, secretary and treasurer.

Bohn Aluminum & Brass Co., 2512 East Grand Boulevard, Detroit, has awarded general contract to Martin-Krausmann Co., 955 East Jefferson Street, for one-story addition, 40 x 300 ft., to cost over $85,000 with equipment, primarily for production of aluminum parts. C. W. Brandt, Francis Palms Building, is architect.

National Production Co., Detroit, has been formed with a capital of $75,000 to take over and expand company of same name, manufacturer of tools and other equipment, with plant at 4561 St. Jean Avenue. Paul P. Barker and L. T. Barker head new organization.

New England

BIDS are being asked on general contract by Vulcan Iron Works, John Street, New Britain, Conn., for a one-story addition, 75 x 175 ft., to cost close to $55,000 with equipment. Company is affiliated with Eastern Malleable Iron Co., Naugatuck, Conn. M. J. Unkelbach, 52 Main Street, New Britain, is architect.

Town School Board, Yarmouth, Mass., plans installation of manual training equipment in new two-story and basement high school in South Yarmouth, to cost about $200,000, for which bids have been asked on general contract. J. H. Ritchie & Associates, 250 Stuart Street, Boston, are architects.

Texas Co., 31 St. James Avenue, Boston, and 17 Battery Place, New York, has awarded general contract to Tucker Construction Co., Turks Head Building, Providence, R. I., for new oil storage and distributing plant at Providence, to cost about $40,000 with equipment.

Worcester Suburban Electric Co., Uxbridge, Mass., has applied for permission to issue stock for $135,000, part of fund to be used for extensions and improvements in power plant and system.

Proctor Brothers & Co., Nashua, N. H., have started work on a machine shop, 30 x 30 ft., and other improvements.

Motors and miscellaneous equipment will be required for a textile printing plant to be built by Sayles Finishing Plants, Inc., at Lincoln, R. I.

Thompson Wire Co., 43 Mildred Avenue, Dorchester, Boston, has started preliminary work on a one-story addition, to cost $20,000 without equipment.

Machine shop and tool room supplies of City Mfg. Co., New Bedford, Mass., were sold at public auction Oct. 8.

Worcester Wire Works, Inc., Worcester, Mass., has plans for an annealing and drying department to replace that recently destroyed by fire.

Boston & Maine Railroad, 150 Beverly Street, Boston, is considering plans for a car repair shop addition at Concord, N. H., to cost $500,000 with equipment.

Electrical and other machinery of Cape Ann Anchor & Forge Works, Gloucester, Mass., last week was considerably damaged by water when fire caused a loss of about $15,000.

Gulf States

CITY COUNCIL, Port Arthur, Tex., is considering construction of a municipal electric light and power plant, to cost over $75,000 with equipment. C. B. Moore is commissioner of city finance, in charge.

Board of City Commissioners, Birmingham, has plans for municipal airport to cost over $800,000, including hangars, repair shops, administration building and other field units. City Engineering Department is in charge.

Standard Oil Co. of Louisiana, 2134 St. Charles Avenue, New Orleans, is planning erection of a new gasoline refinery near Shreveport, La., in cooperation with Triangle Drilling Co., and Louisiana Gas & Fuel Co., affiliated organizations, to utilize output at Sugar Creek field. Project will include a pipe line and will cost over $400,000.

Southwest Food & Refrigeration Co., Pampa, Tex., is planning erection of new plant unit, including refrigerating plant, to cost about $100,000 with machinery.

Kool Air Corporation, Oklahoma City, Okla., manufacturer of air conditioning equipment for motion picture theaters, stores, etc., and other ventilating equipment, is planning establishment of new plant at Dallas, Tex., for main manufacturing works. Initial unit will cost about $30,000 with equipment. Temporary offices at Dallas have been opened at 313 South Harwood Street. G. A. Peterson is president, and S. A. Merion, secretary.

Board of Regents, Southwest Texas State Teachers' College, San Marcos, Tex., has awarded general contract to Richard Schmidt, 59 East Avenue, Austin, Tex., for one-story manual arts building at local institution, to cost about $65,000 with equipment. W. E. Ketchum, Pope Building, Austin, is architect.

Magnolia Petroleum Co., Dallas, Tex., a subsidiary of Standard Oil Co. of New York, will carry out an expansion and improvements in storage and distributing plant at Plainview, Tex., including additional equipment, to cost about $50,000.

Milwaukee

BIDS close Oct. 15 by Klug & Smith Co., consulting engineer, 69 East Wisconsin Avenue, for construction work in connection with a $500,000 plant replacement project of Wrought Washer Mfg. Co., 46 South Bay Street, Milwaukee. Former plant of Beaver Engine Co. has been converted into general manufacturing shop, and work now to be undertaken consists of new rolling mill, 65 x 500 ft.; raw material building, 96 x 400 ft.; finished material building, 130 x 170 ft., and L-shaped extension of main building, 44 x 150 x 250 ft. Fred Doepke is president and general manager.

Milwaukee Valve Co., 139 Burrell Street, is having plans prepared for extensions of brass, bronze and aluminum foundries, new forge shop, and additions to tool room and pattern shop. Work may be started this fall.

Milwaukee Terminal Warehouse Co., 100 West Seeboth Street, has engaged Moores & Dunford, consulting engineers, 110 East Forty-second Street, New York, to design a five-story addition, 62 x 120 ft., to perishable merchandise division of present warehouse. With extension of refrigerating system and other equipment, conveyors, etc., work will cost about $250,000.

State Board of Control, Madison, Wis., is taking bids on materials for construction at Wisconsin State Prison, Waupun, of new two-story shop, 60 x 200 ft., for division manufacturing State's supply of automobile and motor truck license plates. Additional shearing, stamping, punching and enameling oven equipment will be purchased later. Oscar Lee is warden. Arthur Peabody, State achitect, Madison, is handling project.

Common Council of Two Rivers, Wis., will proceed with $100,000 municipal power plant improvement project and has directed E. J. Donnelly, city manager, to investigate relative merits of steam and oil engine equipment. It is planned to start work next spring.

Wheeler-Arnold Co., Wittenberg, Wis., has started work on rehabilitation of snow-fence manufacturing unit, damaged by fire a short time ago.

Horner Flooring Co., Dollar Bay, Mich., manufacturer of hardwood products, has placed general contract with Graham Michels, Houghton, Mich., for new plant, consisting of flooring mill, 60 x 120 ft.;

power plant, 30 x 50 ft.; dry kilns, 60 x 200 ft., and transfer shed, 60 ft. sq. Investment in buildings and equipment is about $100,000.

Pittsburgh

IN connection with installation of new cracking unit for gasoline production, Pennzoil Co., Oil City, Pa., will carry out an expansion program at refinery in cooperation with Independent, Continental and Empire refineries in city, including storage and distributing facilities to handle output of about 2500 bbl. daily.

National Transit Co., Oil City, Pa., has plans for a new two-story foundry, to cost over $40,000 with equipment. R. Stormer, Center Street, is consulting engineer.

Victor Gas Co., a subsidiary of Duquesne Gas Co., Pittsburgh, has begun construction of new pipe line in Fayette County, Pa., for natural gas supply to Monongahela West Penn Gas Co., Fairmont, W. Va., to cost over $200,000.

Gulf Refining Co., Frick Annex, Pittsburgh, is considering construction of new oil storage and distributing plant at Logan, W. Va., to cost about $100,000 with equipment.

Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, manufacturer, has approved plans for a new factory branch and distributing plant at El Paso, Tex., to cost over $60,000 with equipment.

Loyal Burner Mfg. Co., Gregg Street, Glendale, Pittsburgh, manufacturer of oil burners and equipment, plans rebuilding part of three-story plant recently destroyed by fire, with loss close to $50,000 including equipment.

Lewistown Aircraft & Airways, Inc., Lewistown, Pa., Paul S. Lehman, secretary, has plans for a hangar, with repair and reconditioning facilities, at municipal airport on William Penn Highway. Other field units are planned at later date.

Appalachian Electric Power Co., Charleston, W. Va., is planning erection of a hydroelectric generating plant on New River, to cost over $1,000,000 with transmission system.

Byrd Coal Co., Grafton, W. Va., recently formed with capital of $125,000, has purchased coal properties of William Waggy Coal Co., Erbacon, W. Va., comprising 150 acres, and plans development and installation of equipment.

Cleveland

PLANS have been approved by Cleveland Crane & Engineering Co., Wickliffe, Cleveland, for one-story addition, to cost about $40,000 with equipment.

Board of Education, Alliance, Ohio, is considering installation of foundry department in manual training division of high school.

Standard Oil Co. of Ohio, East Ohio Gas Building, Cleveland, is disposing of a preferred stock issue to total $12,000,000, part of proceeds to be used for expansion and improvement in plants and system, including oil storage and distributing facilities.

Utility Rubber Co., Bridgeport, Ohio, care of Michener & Thomas, Cilles Building, attorneys, recently organized with capital of $50,000 by Anthony A. Holler and George B. Smith, Bridgeport, plans operation of local mill for manufacture of rubber goods.

Ohio Edison Co., Akron, Ohio, has approved plans for construction of high-tension transmission line from Toronto, Ohio, to East Akron, including 700 steel towers and other equipment, to cost over $650,000.

Officials of Jordan Motor Car Co., 1070 East 152nd Street, Cleveland, are organizing Jordan Motors Corpn., with capital of 500,000 shares of stock, no par value, to take over and expand present plant and business of Jordan company. Works will be arranged for production of new type of automobile, including parts and assembling. Edward S. Jordan will continue as president of new organization.

Pittsburgh, Youngstown & Ashtabula Railway Co., Youngstown, has acquired local property for extensions and improvements in yards, freight terminal and shop units, to cost over $800,000.

St. Louis

CONTRACT has been let by Continental Supply Co., 19 South Main Street, Tulsa, Okla., oil well equipment and supplies, to George J. Bowie, A. & B. Building, for two-story and basement storage and distributing plant, 75 x 140 ft., to cost about $30,000 with equipment. A. M. Atkinson, Mid-Continent Building, is architect.

Board of Public Works, Wichita, Kan., C. C. Ellis, city clerk, has plans for one-story and basement municipal repair shop, 35 x 70 ft., to cost about $20,000 with equipment. Ellis, Charles & Co., Orpheum Building, are architects.

American Eagle Aircraft Corporation, Rickel Street and American Eagle Road, Kansas City, Mo., manufacturer of airplanes and parts, has authorized a bond issue of $500,000, part of proceeds to be used for expansion and improvements.

Phillips Petroleum Co., 6291 Suburban Avenue, St. Louis, is planning an expansion and improvements to cost about $5,000,000, including construction of new oil terminal at East St. Louis, Ill., to cost close to $1,000,000, including pipe lines, etc.

Ovens, power equipment, conveying and other machinery will be installed in new plant to be erected by Butter Nut Bread Co., Texarkana, Ark., to cost about $100,000.

Jonesboro Rice Milling Co., Jonesboro, Ark., recently organized by Harry E. Bovay and associates, has awarded general contract to E. C. Hodges, Cotton Exchange Building, Memphis, Tenn., for four-story plant, to cost about $120,000 with machinery, including screening, conveying and other equipment.

Atchison, Topeka & Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, has rejected bids and is having revised plans drawn for one-story addition to boiler shop at Topeka, Kan., 50 x 51 ft., including improvements in present unit, and will ask new bids soon, to cost about $30,000. H. W. Wagner is chief engineer.

Southern United Ice Co., Jackson, Miss., is considering one-story ice-manufacturing plant at Newton, Ark., to cost close to $35,000 with machinery.

C. J. Conway, 3004 Linwood Street, Kansas City, Mo., and associates have organized Safety Window Jack Co., to operate plant for manufacture of a patented window jack and other equipment.

Steel Castings, Inc., Sand Springs, Okla., recently organized by F. F. Shoemaker and associates, is planning erection of one-story foundry and production of steel and other metal castings, to cost over $45,000 with equipment. Company will be associated with Tulsa Stove & Foundry Co.

International Coin Separator Co., G. A. Morris, president, 2537 Natural Bridge Avenue, St. Louis, has been incorporated to manufacture a coin separating machine, now made under contract by Alpha Machine Co., 1820 North Eighteenth Street, St. Louis.

Cincinnati

WORK has begun by Grimm Iron Works, 2431 Spring Grove Avenue, Cincinnati, on one-story plant, 80 x 172 ft., to cost about $60,000 with equipment.

Dalton Adding Machine Co., Beech Street, Norwood, Cincinnati, has awarded contract to William R. Griffin, Cincinnati, for one-story addition. Company is a division of Remington-Rand, Inc., New York.

Arran Airways, Inc., Memphis, Tenn., has awarded general contract to S. & W. Construction Co., Shrine Building, for hangar, 90 x 180 ft., with repair facilities and other field units at airport, to cost about $85,000 with equipment. Contracting company will prepare plans.

Container Corporation of America, Inc., Circleville, Ohio, plans rebuilding part of plant recently destroyed by fire, with loss close to $100,000.

Board of Education, Bedford, Ky., plans installation of manual training equipment in new two-story and basement high school, for which plans are being prepared by Harry E. Boyle & Co., Furniture Building, Evansville, Ind., architects.

E. S. Fairchild, 1207 North Lang Avenue, Pittsburgh, Pa., and associates are organizing a company to construct a lead plant near Charleston, Tenn., including installation of smelting furnaces and auxiliary equipment, conveying and other machinery, to cost over $100,000. It is proposed to establish headquarters for new company at Chattanooga, Tenn.

Board of Public Works, Memphis, Tenn., has engaged Fuller & McClintock, 170 Broadway, New York, consulting engineers, and Thomas H. Allen, 65 McCall Street, Memphis, engineer, to prepare plans for new electric-operated pumping plant for municipal waterworks, to cost about $1,500,000 with engines and other machinery.

Mitchell Spring Service Co., 427 East Third Street, Dayton, Ohio, is planning installation of equipment for automobile spring and repair works.

Globe Tool & Engineering Co., Dayton, Ohio, has moved into its new plant at 420 Davis Street and is manufacturing small airplane motors.

Indiana

MANUAL training equipment will be installed in new three-story and basement Lew Wallace high school at Gary, to cost $1,000,000, for which bids on general contract for first unit will be received until Oct. 28. William B. Ittner, Inc., 911 Locust Street, St. Louis, is architect.

Hopkins Fertilizer Co., New Albany, manufacturer of commercial fertilizer,

plans rebuilding of part of plant recently destroyed by fire, with loss over $200,000, including equipment. Company is a subsidiary of Davison Chemical Co., Garrett Building, Baltimore.

Southeastern Indiana Power Co., Rushville, has acquired Rush County Power Co., operating at Bentonville, Greensboro, Cadiz and vicinity, and will consolidate. Purchasing company plans expansion, including transmission lines.

Supreme Oil & Refining Co., 518 North Delaware Avenue, Indianapolis, has awarded general contract to J. R. Curry Co., Empire Life Building, for one-story storage and distributing plant, 100 x 102 ft., to cost about $50,000 with equipment.

Link-Belt Co., South Belmont Avenue, Indianapolis, has authorized installation of a pulverized coal system at local Ewart plant, to cost about $125,000. George P. Torrence, vice-president, is in charge of local works.

Polar Ice & Fuel Co., 2000 Northwestern Avenue, Indianapolis, is planning expansion and improvements at ice-manufacturing plants, to cost over $80,000 with machinery.

Coca-Cola Bottling Co., 858 Massachusetts Avenue, Indianapolis, has awarded general contract to William P. Jungclaus Co., 825 Massachusetts Avenue, for two-story and basement plant, 100 x 200 ft., to cost about $100,000, including equipment, etc. Rubush & Hunter, Architects and Builders Building, are architects.

Wood Mosaic Co., New Albany, plans rebuilding part of plant recently destroyed by fire, with loss over $125,000, including equipment.

John Beckett, Dayton, Ohio, has purchased Wandtke Pattern & Foundry Co., Anderson, and plans enlargement. Several months ago H. J. Wandtke sold his interest to his partner, George Pierce, who owned the building. Mr. Pierce will retain an interest in the pattern making department which will be operated in connection with the foundry.

Pacific Coast

PLANS are under way by Pacific Gas & Electric Co., 245 Market Street, San Francisco, for equipment storage, service and distributing buildings at Redwood City and Auburn, Cal., to cost about $50,000 and $40,000, respectively. Company engineering department is in charge.

Board of Education, Pasadena, Cal., plans installation of manual training equipment in new junior high school group at Altadena, to cost about $250,000, for which plans are being drawn by Marston & Maybury, 25 South Euclid Avenue, Pasadena, architects.

Hammer-Bray Co., Twenty-sixth Avenue and East Twelfth Street, Oakland, Cal., manufacturer of stoves, ranges, etc., has plans for a new plant, to cost over $100,000 with equipment. C. N. Burrell, American Building, is architect.

Board of County Supervisors, Modesto, Cal., has plans for a two-story power house at local Stanislaus County Hospital, to cost about $40,000 with equipment. Russell G. DeLappe, 1710 Franklin Street, Oakland, Cal., is architect.

California Oregon Power Co., Medford, Ore., has applied for permission to appropriate water from North Umpqua River in Oregon for seven hydroelectric generating plants, to develop total capacity of 188,661 hp., to cost $29,650,000 with steel tower transmission lines and other distributing facilities.

Furniture Corporation of America, Inc., Portland, Ore., care of H. A. Green, president, Doernbecher Mfg. Co., East Twenty-eighth Street North, recently formed by Mr. Green and associates with capital of $20,000,000 to take over and consolidate 13 furniture manufacturing companies on Pacific Coast, including Doernbecher company, is considering erection of new central plant at Emeryville, Cal., where several interests will be consolidated, to cost over $350,000 with equipment. Mr. Green will be chairman of board of new organization.

City Council, Douglas, Ariz., has plans for a new hangar with repair facilities at local International airport, to cost about $35,000 with equipment.

Acme Packing Co., Glendale, Wash., has plans for a new one-story meat-packing plant, 70 x 190 ft., with machine department, refrigerating division, etc., to cost over $100,000 with equipment. A boiler plant will be built. J. M. Taylor, Jr., McDowall Building, is architect.

Officials of Isaacson Iron Works, 2917 East Marginal Way, Seattle, manufacturer of marine forgings, automobile bodies, etc., have organized Isaacson Iron Works of Seattle in Portland, Inc., with capital of $450,000, to operate a plant at Portland. John and Henry Isaacson head new company.

Canada

A RECONSTRUCTION program involving an expenditure of $3,000,000 in buildings and machinery is under way at works of Canada Cement Co., Ltd., Phillips Square, Montreal.

Jenkins Brothers, Ltd., Rockfield and Dominion Streets, Montreal, are having plans prepared for a foundry and several other buildings. Bids will probably be called during winter.

Rainbow Craft Co., care of S. D. Terry & Co., Canadian Pacific Railroad Building, Toronto, will start work at once on a one-story brick factory, 40 x 200 ft., at Gravenhurst, Ont., to cost $35,000.

Bonna Pipe Co. of Canada, Ltd., care of B. & S. H. Thompson, Ltd., 485 McGill Street, Montreal, will establish a plant at Montreal for manufacture of steel core reinforced concrete pipe. It is expected to be ready for production by first of year. Company has contracts from city to supply 15,260 ft. of 36-in. pipe.

Work will be started soon on rebuilding sawmill at Timmons, Ont., for Fesserton Timber Co., Ltd., 15 Toronto Street, Toronto, to replace mill destroyed by fire. New machinery will be purchased in spring.

Several contracts have been awarded for an addition for Service Station Equipment, Ltd., 101 Hanson Street, Toronto, to cost $15,000. John T. Hepburn, Ltd., 18 Van Horne Street, has been awarded structural steel. D. Brouse is architect.

Canadian White Pine Co., Ltd., foot of Doman Road, Vancouver, B. C., has started work on a lumber mill, for which equipment will be purchased.

Foreign

OFFICIALS of Ruhr Gas Co., Frankfort, Germany, and Société d'Enterprise de Canalisation, Paris, France, have organized Compagnie Internationale des Canalization, to construct and operate a natural gas pipe line from fields in Polish Upper Silesia, initial installation to cost over $1,000,000.

Metal Box & Printing Industries, Ltd., London, England, affiliated with Continental Can Co., 1 Pershing Square, New York, has begun construction of new plant for manufacture of packers' cans and containers, to cost about $500,000 with machinery.

Compagnie Parisienne de Distribution d'Electricité, Paris, France, operating electric light and power properties, has arranged for an increase in capital from 100,000,000 to 200,000,000 fr. (about $3,900,000 to $7,800,000), part of fund to be used for expansion and improvements.

Plans are under way by Spanish and French interests for a hydroelectric and irrigation project on Muluya River, which forms boundary between Spanish and French Morocco, including construction of power dam 213 ft. high to impound about 1,000,000,000 cu. meters of water, to irrigate over 64,000 acres. Project will include transmission and distributing power lines. Further information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Morocco No. 5241.

Jose Arrechabala, Cardenas, Cuba, operating a sugar mill, is planning to rebuild part of property, including storage and distributing plant, recently destroyed by fire, with loss over $150,000.

New Trade Publications

Copper Brazing and Copper-Brazing Furnaces.—General Electric Co., Schenectady, N. Y. Bulletin GEA-1291 of 19 pages, describing a copper-brazing process for fabricating steel parts in furnaces with controlled reducing atmospheres, also employed in the manufacture of turbines, refrigerators and other apparatus. Illustrations show tools, machinery and furnaces.

Industrial Furnaces.—George J. Hagan Co., Pittsburgh. Bulletins Nos. 81,130 to 81,530 inclusive, describing and illustrating the company's furnace equipment. Bulletin 81,130 deals with car-type furnaces, bulletin 81,230 with the rotary-hearth type, bulletin 81,330 with the box type, bulletin 81,430 with the pusher type, and bulletin 81,530 with the apron-conveyor type.

Shear Knives.—Heppenstall Co., Pittsburgh. Booklet of 16 pages, dealing with shear knives made from various combinations of alloy steels, and used for different purposes. Standard shear knives are described, particularly adapted for sheets, tin plate and strips, sheet and tin plate bars, plates and structural members, automotive carbon and alloy steel bars, iron, steel and non-ferrous scrap, hot and cold steel and non-ferrous blooms and billets.

General Protective Coating.—Headley Emulsified Products Co., Franklin Trust Building, Philadelphia. Bulletins 330 and 430, of 27 and 11 pages respectively, dealing with asphalt-base aluminum coating and waterproofing and damp-proofing coatings for roofing and protective coating purposes. The larger bulletin is well illustrated.

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Plans for the plant are the result of exhaustive research accomplished with the aid of every resource of modern science. Biological and psychological studies have been made to determine the effects upon human efficiency of such factors of workshop environment as light, temperature, sounds and color. One of the many innovations resulting from these studies will be orange-colored paint for the machines, to lift their visibility and help reduce accidents. Walls and ceiling will be blue, green and white. The lighting system will be arranged to supply ultra-violet rays.

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The great bulk of the decrease during the past quarter, Lloyd's points out, was due to the decline in work in Great Britain and Ireland, where 275,000 gross tons less is now in the hands of the shipbuilders than at the end of last June. For the United States the decline for the same period was only 25,000 tons. Germany's total decreased 43,000 tons, Denmark's 18,000 tons, and Japan's 17,000 tons, while small decreases were shown for Holland and Sweden. France and Italy were the only countries to show gains, the former country increasing the work in hand 22,000 tons, and Italy raising its total 45,000 tons.

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British May Advance Warship Building As Aid to Shipyards

(*By Cable*)
London, England, Oct. 13.

THE Marquis of Linlithgow, who presided at the James Watt dinner of the Institution of Engineers and Shipbuilders in Scotland, urged Government and local authorities to reduce the burdens of taxation and rating, and suggested that the program of warship construction be advanced to meet the present urgent need for work in shipyards.

Referring to the current depression he said: "The public must not be allowed to forget that the industrial difficulties are by no means confined to the period of world depression, heralded by the general collapse of stock values in the autumn of last year. The depression in the heavy industries here commenced about 1921 and has been continued without intermission."

The chairman of the board of British Guest, Keen, Baldwins Iron & Steel Co., in a letter to Mayor Merthyr Tydfil, regarding the closing of the Dowlais Works, says: "To meet modern conditions, modernized works must be operated on the seaboard, and heavy transport charges, which have been a handicap to Dowlais for many years must be abolished. The product of the Dowlais Works cannot now be sold at a price sufficient to pay the cost of operating. All that will be left of the once prosperous South Wales heavy iron and steel trade, when work at Dowlais ceases, will be one blast furnace at Cardiff and one at Port Talbot."

British urge warship building to aid empty shipyards.

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British depression began in 1921 and not last fall, says Marquis of Linlithgow.

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Reestablishment of Continental Steel Cartel being discussed.

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Australian Government bounties to steel industry exceeded $1,265,000 in 12 months.

Local demand for Cleveland pig iron is improved and surplus output is now being absorbed after local steel mill needs have been met. Otherwise the general iron and steel situation is unchanged and in some cases growing worse. Closing the Dowlais Works at Cardiff involves about 2500 men and more blast furnaces have been closed in Scotland and the Midlands.

Finished steel is very quiet. Steel makers are meeting this week and the price situation is expected to be reviewed, which has resulted in consumers refraining from buying.

Export demand for heavy steel is negligible and new shipbuilding is poor. Structural and engineering demands are insufficient to keep mills regularly employed.

The Continental market is displaying continued weakness in the absence of good buying. Reports are current that efforts will be made to renew the Continental Steel Cartel, Jan. 1, on a new basis, but opinion differs as to its success. Meanwhile, mills are soliciting orders without much success especially from consumers in England.

Tin plate is quiet, consumers being perturbed at the tin market decline and expecting to be able to buy tin plate cheaper before long. Merchants are selling for forward delivery at less than schedule, but mills are adhering to 17s. to 17s. 6d. ($4.13 to $4.25) per base box, f.o.b. works port, according to the condition of their order books.

Galvanized sheets are inactive. Makers are unsuccessfully quoting India £12 7s. 6d. per ton (2.68c. per lb., c. & f., and other markets £11 12s. 6d. per ton (2.652c. per lb.), f.o.b. works port.

United Kingdom exports of galvanized sheets only in September were 23,000 tons, of which only 2500 tons went to India. Black sheets are dull and mills rolling Japanese thin gage sheets are almost without business.

British pig iron exports in September totaled 13,000 tons of which the United States received 500 tons. Total exports of iron and steel were 200,300 tons.

Pease & Partners have appointed an independent committee to investigate the company's affairs with a view to financial reorganization.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Ferromanganese, export	£11	5s.	to	£11	10s.	$54.75	to	$55.95
Billets, open-hearth	5	15	to	6	5	27.98	to	30.41
Black sheets, Japanese specifications	12	5				59.61		
Tin plate, per base box	0	17	to	0	17½	4.13	to	4.25
						Cents a Lb.		
Steel bars, open-hearth	7	15	to	8	5	1.69	to	1.79
Beams, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Channels, open-hearth	7	12½	to	8	12½	1.66	to	1.87
Angles, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Black sheets, No. 24 gage	9	10	to	9	15	2.06	to	2.12
Galvanized sheets, No. 24 gage	11	12½				2.52		

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£2	12½s.	to	£2	13s.	$12.66	to	$12.90
Billets, Thomas (nominal)	3	11½	to	3	12½	17.39	to	17.64
Wire rods, low C., No. 5 B.W.G.	5	2½	to	5	7½	24.94	to	26.15
Rails, light	6	0				29.20		
Black sheets, No. 31 gage, Japanese	11	5	to	12	12	54.68	to	58.32
						Cents a Lb.		
Steel bars, merchant	4	2	to	4	3	0.93	to	0.94
Steel bars, deformed	4	10	to	4	11	0.99	to	1.00
Beams, Thomas, British standard (nominal)	3	17	to	3	18	0.84	to	0.85
Channels, Thomas, American sections	5	12	to	5	14	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	3	17½	to	3	18	0.85	to	0.86
Angles, Thomas, 3-in.	4	3	to	4	4	0.92	to	0.95
Hoop and strip steel over 6-in. base	4	15				1.05		
Wire, plain, No. 8 gage	5	17½				1.29		
Wire, barbed, 4-pt. No. 12 B.W.G.	9	15				2.11		
Wire nails, base	5	17½				$1.29 a keg		

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London, England, Oct. 13.

THE Marquis of Linlithgow, who presided at the James Watt dinner of the Institution of Engineers and Shipbuilders in Scotland, urged Government and local authorities to reduce the burdens of taxation and rating, and suggested that the program of warship construction be advanced to meet the present urgent need for work in shipyards.

Referring to the current depression he said: "The public must not be allowed to forget that the industrial difficulties are by no means confined to the period of world depression, heralded by the general collapse of stock values in the autumn of last year. The depression in the heavy industries here commenced about 1921 and has been continued without intermission."

The chairman of the board of British Guest, Keen, Baldwins Iron & Steel Co., in a letter to Mayor Merthyr Tydfil, regarding the closing of the Dowlais Works, says: "To meet modern conditions, modernized works must be operated on the seaboard, and heavy transport charges, which have been a handicap to Dowlais for many years must be abolished. The product of the Dowlais Works cannot now be sold at a price sufficient to pay the cost of operating. All that will be left of the once prosperous South Wales heavy iron and steel trade, when work at Dowlais ceases, will be one blast furnace at Cardiff and one at Port Talbot."

British urge warship building to aid empty shipyards.

* * *

British depression began in 1921 and not last fall, says Marquis of Linlithgow.

* * *

Reestablishment of Continental Steel Cartel being discussed.

* * *

Australian Government bounties to steel industry exceeded $1,265,000 in 12 months.

Local demand for Cleveland pig iron is improved and surplus output is now being absorbed after local steel mill needs have been met. Otherwise the general iron and steel situation is unchanged and in some cases growing worse. Closing the Dowlais Works at Cardiff involves about 2500 men and more blast furnaces have been closed in Scotland and the Midlands.

Finished steel is very quiet. Steel makers are meeting this week and the price situation is expected to be reviewed, which has resulted in consumers refraining from buying.

Export demand for heavy steel is negligible and new shipbuilding is poor. Structural and engineering demands are insufficient to keep mills regularly employed.

The Continental market is displaying continued weakness in the absence of good buying. Reports are current that efforts will be made to renew the Continental Steel Cartel, Jan. 1, on a new basis, but opinion differs as to its success. Meanwhile, mills are soliciting orders without much success especially from consumers in England.

Tin plate is quiet, consumers being perturbed at the tin market decline and expecting to be able to buy tin plate cheaper before long. Merchants are selling for forward delivery at less than schedule, but mills are adhering to 17s. to 17s. 6d. ($4.13 to $4.25) per base box, f.o.b. works port, according to the condition of their order books.

Galvanized sheets are inactive. Makers are unsuccessfully quoting India £12 7s. 6d. per ton (2.68c. per lb., c. & f., and other markets £11 12s. 6d. per ton (2.652c. per lb.), f.o.b. works port.

United Kingdom exports of galvanized sheets only in September were 23,000 tons, of which only 2500 tons went to India. Black sheets are dull and mills rolling Japanese thin gage sheets are almost without business.

British pig iron exports in September totaled 13,000 tons of which the United States received 500 tons. Total exports of iron and steel were 200,300 tons.

Pease & Partners have appointed an independent committee to investigate the company's affairs with a view to financial reorganization.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Ferromanganese, export	£11	5s.	to	£11	10s.	$54.75	to	$55.95
Billets, open-hearth	5	15	to	6	5	27.98	to	30.41
Black sheets, Japanese specifications	12	5				59.61		
Tin plate, per base box	0	17	to	0	17½	4.13	to	4.25
						Cents a Lb.		
Steel bars, open-hearth	7	15	to	8	5	1.69	to	1.79
Beams, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Channels, open-hearth	7	12½	to	8	12½	1.66	to	1.87
Angles, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Black sheets, No. 24 gage	9	10	to	9	15	2.06	to	2.12
Galvanized sheets, No. 24 gage	11	12½				2.52		

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£2	12½s.	to	£2	13s.	$12.66	to	$12.90
Billets, Thomas (nominal)	3	11½	to	3	12½	17.39	to	17.64
Wire rods, low C., No. 5 B.W.G.	5	2½	to	5	7½	24.94	to	26.15
Rails, light	6	0				29.20		
Black sheets, No. 31 gage, Japanese	11	5	to	12	12	54.68	to	58.32
						Cents a Lb.		
Steel bars, merchant	4	2	to	4	3	0.93	to	0.94
Steel bars, deformed	4	10	to	4	11	0.99	to	1.00
Beams, Thomas, British standard (nominal)	3	17	to	3	18	0.84	to	0.85
Channels, Thomas, American sections	5	12	to	5	14	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	3	17½	to	3	18	0.85	to	0.86
Angles, Thomas, 3-in.	4	3	to	4	4	0.92	to	0.95
Hoop and strip steel over 6-in. base	4	15				1.05		
Wire, plain, No. 8 gage	5	17½				1.29		
Wire, barbed, 4-pt. No. 12 B.W.G.	9	15				2.11		
Wire nails, base	5	17½				$1.29 a keg		

Stewarts & Lloyds and Tube Investments, Ltd., the latter company controlling many tube makers, are proposing a merger to achieve close cooperation and eliminate waste.

French production in August was 845,000 metric tons of pig iron and 775,000 tons of raw steel. At the end of August 143 furnaces were in blast.

Polish output in August was 38,000 metric tons of pig iron, 105,000 tons of raw steel, 76,000 tons of rolled steel and 6000 tons of tubes.

Australian Steel Bounties Exceed Million Dollars

WASHINGTON, Oct. 14.—In view of the action by the Australian Government in prohibiting importation of galvanized sheets to aid the domestic industry, reported in THE IRON AGE, Oct. 6, in the weekly cable from London, it is of interest that the Australian iron and steel bounty paid out by the government in the year ended June 30 totaled £260,386 ($1,265,477). Payments under the various bounty acts reached £528,638 ($2,569,180), according to the American consul in Sydney. The iron and steel bounty was distributed, as follows: galvanized sheets, £89,560 ($435,562), wire netting, £56,485 ($274,517) and fencing wire £114,140 ($554,720).

Japanese Pig Iron Stocks Large

YOKOHAMA, JAPAN, Sept. 20.—A survey of pig iron stocks in Japan by the Mitsubishi Shoji Kaisha shows that on July 31, there was a total of 359,145 metric tons in stocks, of which 236,691 tons was in consumers' yards. Dealers stocks included 33,336 tons of Indian iron.

Iron Ore Imports Relatively Light

Imports of iron ore into the United States in August are reported by the Department of Commerce at 178,171 gross tons, of which almost 60 per cent came from Chile. This is 31 per cent below the July movement, and is 40 per cent below last year's incoming total of 298,013 tons.

Nevertheless, the incoming tonnage for the eight months of the year shows an increase of about 3 per cent on 1929, based on a much larger influx during the early months.

Estimates Average Cost of Tin Plate at $90

YOKOHAMA, JAPAN, Sept. 20.—Managing director Takasaki of the Oriental Can Mfg. Co., Ltd., which is contemplating installation of equipment to produce its own tin plate, reported on his recent return from abroad that "for about half a year I have inspected the leading tin plate works in the United States, England, Germany, France and Luxemburg." He found all the tin plate mills well engaged with business, while other steel products were in but little demand. While the cost of production varied with the different mills, he estimated it to be $90 a ton, averaging high and low cost plants.

"Educational Orders" For Munitions Urged

WASHINGTON, Oct. 14.—Educational orders for munitions are in the judgment of American business men of profound and far-reaching significance from the viewpoint of bringing the defense of the country abreast with the industrial era in which we live.

This conclusion was presented by Ernest T. Trigg, chairman, National Defense Committee, United States Chamber of Commerce, in an address here on Tuesday night of last week before the Army Ordnance Association. The meeting was given over to discussions on industrial preparedness and preceded a demonstration at the Aberdeen, Md., proving grounds on the day following.

Mr. Trigg urged enactment by Congress of a bill which will give the Secretary of War sufficient discretion, properly safeguarded, to place orders with the requirements of industrial preparedness in mind. The bill has the support of the chamber. The purpose of such orders is to provide commercial factories capable of conversion to specialized war production with the minimum of personnel essential to keep the art of manufacture alive and with the minimum equipment of tools essential to insure rapid conversion from ordinary peace time to war time production.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	August		Eight Months Ended August	
	1930	1929	1930	1929
Chile	105,765	170,756	1,259,730	1,083,623
Cuba	....	51,000	190,654	439,350
Spain	4,500	....	53,063	38,231
Sweden	17,266	44,897	159,172	210,367
French Africa	31,550	18,815	196,975	128,475
Canada	120	764	356	3,360
Other countries	18,970	11,781	263,366	163,801
Total	178,171	298,013	2,123,316	2,067,207

Soviet Oil Equipment Buying Swells Exports

WASHINGTON, Oct. 14.—Greatly increased shipments to Soviet Russia accounted for the 12 per cent gain in exports of well and refinery machinery in the first eight months of 1930, with a value of $19,082,000, when compared with exports in the corresponding period of 1929, which previously held the record. Should the Russian eight-months' trade in 1930, which amounted to $7,349,000, be deducted, the value of exports would be considerably less than the abnormally large volume of the 1929 period, but substantially more than in the first eight months of 1928.

Japan's Domestic Scrap Lower Than Foreign

YOKOHAMA, JAPAN, Sept. 20.—When about 28,000 tons of steel scrap was imported last June, Japanese holders of scrap became alarmed at the depressing effect of a surplus supply and sought aid from the Government Steel Works to curtail purchases abroad. Since then, the Japanese scrap market has declined until the present price for domestic heavy melting steel is 22 to 23 yen ($10.75 to $11.25) a ton. Foreign heavy melting steel is quoted at 35 to 36 yen ($17.15 to $17.65) a ton. The considerable difference in price and the decreased requirements for scrap in a depressed steel market have restricted importation of foreign material, and improved demand is not expected for some months.

Offers $4000 In Prizes for Elevated Tank Designs

The Chicago Bridge & Iron Works, 2011 Old Colony Building, Chicago, has announced that it will give $4000 in prizes for improved designs for elevated steel tanks. The contest is being undertaken with a view to improving the appearance of such structures.

The jury of awards comprises Howard Cheney and R. W. Zimmerman, Chicago, architects, and George T. Horton, president, Chicago Bridge & Iron Works. Albert M. Saxe, 430 North Michigan Avenue, Chicago, has been appointed professional advisor for the competition and will handle all communications regarding it. The competition is open to architects, engineers and draughtsmen all over the world. The closing date is March 1, 1931.

Charles C. Burstein Co., 1507 Clark Building, Pittsburgh, has been organized to deal in iron and steel scrap. The founder of the company, whose name it bears, has been associated for a number of years with the Erie Iron & Steel Co., Erie, Pa.

Physics as an Aid to Metallurgy

(*Continued from page* 1067)

Experiments must be conducted on a laboratory scale, and on small production basis, before they are even suggested for large scale operations. At the same time the results of the experiments at all stages must be carefully watched so that the difficulties which may arise as the work proceeds will be anticipated as far as possible. This is roughly the procedure of any experimental work intended for mill operations. There will be numerous failures in the experiments, results of an entirely unexpected nature will arise, and it will depend upon the experience of a number of men of entirely different training to explain the phenomena and to use them to full advantage.

X-Ray Diffraction and Metallurgy

Perhaps one of the most interesting of the comparatively recent developments of physics, which is finding applications in metallurgy, is X-ray diffraction work. The physicist has performed marvels in elucidating the atomic structure of crystalline forms. The work which is being conducted in Manchester under Prof. W. L. Bragg has brought surprising results, for Bragg and his associates have been able to determine the relative positions of the atoms in a great number of the extremely complicated silicates which exist in nature.

Westgren and Phragmen have done yeoman service to metallurgy in all its branches by work of a fundamental nature on innumerable alloy systems. They have determined the space groups of numberless metal phases. They have determined the position of the atoms in the unit cell. These physicists have created the background, and the metallurgist, in making use of their technique, dispenses with the more fundamental nature of the work, applies the technique in a relatively simple manner to his own complicated problems and obtains solutions which may completely revolutionize his ideas.

However, it must be realized that, without the initial work of the physicist and without his elucidation of the fundamentals, the simple methods would not exist. An example of this may be given in the case of identifying a certain crystalline phase. Mr. Bragg gave a simple yet accurate conception of the reflection of X-rays from atom planes. It is this: X-rays are reflected from atom planes only when the beam of X-rays subtends with the atom plane a certain critical angle. The angle of reflection is given by the formula:

$N\lambda = 2d \sin \theta$, where θ = the critical angle of reflection, λ = wave length of the monochromatic X-rays used, N = order of plane.

It is then a matter of geometry to determine from what atom plane the reflection, represented by a line on the photograph, takes place.

From this information it is possible, again from geometrical considerations and provided certain crystallographic data are available, to calculate the size of the unit cell. The unit cell may be roughly defined as the smallest grouping of atoms which gives the crystal form. The work required to obtain the correct answer for a space group is usually complicated and tedious. It had to be done and the theory of X-ray diffraction was substantiated for a number of cases before the following simple method could be used for identifying crystal phases. The substance (if non-metallic) is preferably reduced to the powder form, while for metals, filings may be used or, better still, a specimen of specific shape is prepared. It is filled into one-half of a piece of capillary tubing while the other half is filled with a standard. A beam of X-rays confined by a slit system (the slit image is shown in Fig. 3) strikes the samples, diffraction takes place and a series of lines is obtained (see illustration). These lines represent the critical reflections of the X-rays from the atom planes.

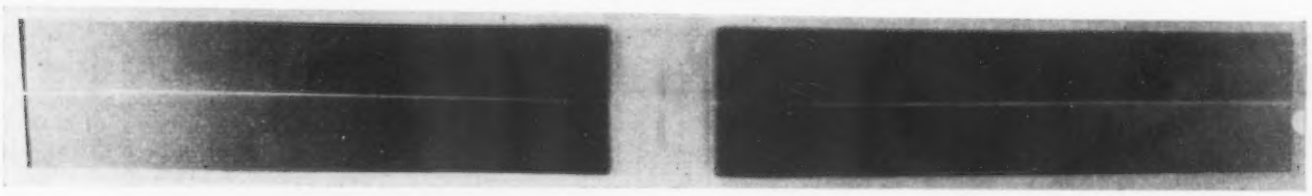

Fig. 3—Slit image produced by a beam of X-rays

By using a standard we are able to determine the radius of the film and from the knowledge of the radius and the distance of the lines from the slit image or undeviated image and the wave length of the X-rays used, the distance between the atom planes is calculated. Some of the lines will belong to one phase and some to another, but, by comparing the values for the atomic spacings with known values, we are able to identify the phases.

An illustration of this may be taken from a non-metal field. The atom spacings for an open-hearth slag were found to contain a number of lines which could not be interpreted into any of the cubic forms. It was felt that the lines might be due to one of the forms of dicalcium silicate. The three forms of the dicalcium silicate were X-rayed and the values for the atomic spacings determined. In comparing the values of the unknown lines with those for the known phases, the phase present in the slag was identified as B dicalcium silicate. For this identification the investigator depended upon the fact that, when two substances have exactly the same atom spacings and the lines have the same relative photographic intensities, they are either the same substance or exactly isomorphous.

In an investigation of two components A and B, a third phase appeared which could not be accounted

for on the basis of the particular system. A nitride was suspected; the possible nitrides were prepared, X-rayed and their atomic spacings determined. It was found that the unknown lines from the alloy system gave the atomic spacings of one of the nitrides and identification was complete. The value of the theoretical work in this field is to give information as to how far we may carry the interpretations and where care must be taken not to draw unwarranted assumptions.

A simple form of X-ray apparatus is shown in Figs. 1 and 2. The power equipment consists of a high-tension transformer, 25 kw. capacity, a filament lighting transformer which is insulated for as high a voltage as the high-tension transformer, but supplies a voltage to the filament of the X-ray tube of 12 volts, at a current of 4 to 5 amp., and, thirdly, a synchronous rectifier. The X-ray tube is contained in the lead cylinder mounted on the table, the tube passing down through a hole to the high-tension connections. Around the lead jacket are placed a series of slits which confine the X-ray beam to the desired shape of cross-section, depending upon the type of work; for powder photographs slits are used, giving a beam approximately ½ in. wide, 1/16 in. deep, while for investigation of orientation, a pinhole is used approximately 0.030 in. in diameter.

The lines obtained on a powder photograph from substances which crystallize in the cubic form have characteristics which are easily distinguishable, though care must be taken to avoid confusion with one of the other crystal systems. For example, the body centered cubic structure has an atom at each of the corners of a cube and one atom at the center of the cube. This structure gives a photograph in which each line is spaced apart from the others. The face centered cubic structure consists of an atom at each corner with one in the center of each of the faces. This gives a photograph in which the lines alternate two-one-two-one, and so on.

It happens that ferrite or the low temperature form of iron is body-centered, giving a one-one-one structure, and austenite, the high temperature form, is two-one-two-one. It is therefore relatively easy, for any given steel, to say whether it is austenitic or consists entirely of ferrite. This differentiation is very easily made and a suitably constructed equipment will indicate relatively small quantities of ferrite or austenite, depending upon the particular case.

This phenomenon has a very special interest in the case of the stainless steels or irons. The composition containing high chrome (14 to 18 per cent) consists entirely of ferrite, while the high chrome-nickels (18 per cent Cr and 8 per cent Ni) are austenitic. On cold working this material, alpha iron or ferrite is precipitated, depending to some extent upon the amount of cold work.

X-Ray Work Applied to Alloy Steel Chisels

An interesting application of this type of X-ray work may be illustrated by the attempt to manufacture track chisels from chrome-molybdenum steels. The usual chisel is made of carbon-vanadium and will stand about 2000 blows. It was found that properly made chisels of the chrome-molydenum analysis would stand 20,000 blows. The particular steel suggested for this purpose contained approximately 0.50 per cent C, 1 per cent Cr, and 0.25 per cent Mo. However, when the plant went into operation and the first batch of these chisels was turned out on a large scale, it was found that almost every one of them was cracked.

The situation was difficult. The steels had responded admirably to manufacture on a laboratory scale, but were useless when produced in mass. The metallurgist interested in the case realized that, on quenching, the material was not full hardening, an indication that austenite was being retained. Then, when the material was "drawn" at about 350 deg. Fahr., some of the austenite would change to martensite, which is essentially alpha iron. This change increased the hardness. The cooling of the metal brings about a contraction. The outside, owing to the rapid cooling, sets first and the inside, cooling more slowly, tends to pull away from the outside shell, so rupturing the metal.

The metallurgist then referred to a paper written by Messrs. Grossmann and Bain, in which some beautifully conducted experiments on the contractions and dilatations of steels containing austenite were described. From this paper the theory underlying the prevention of cracking became apparent. Austenite on changing to martensite gives rise to a dilatation, and there is, of course, a contraction due to thermal changes. Therefore, if a piece of metal is cooled and thus contracts (producing a strained condition), and the austenite of which the metal is composed is being converted into martensite, then the one contraction is being balanced by a dilatation due to the change of phase.

If the conditions are suitably balanced, a piece of steel is produced which is free from strains and at the same time possesses the tough, hard structure given by the grains of martensite held in envelopes of austenite. Unfortunately the quenching and drawing operations have to be performed with extreme accuracy, not only with respect to temperature, but also to small intervals of time.

In this particular case X-ray investigation, which demonstrated clearly the presence of martensite and austenite, justified the theory, and substantiated the reasonableness of the suggested treatment. The X-ray examination, while simply performed, was conclusive in its results and though the making of track chisels of this type was discontinued, owing to the difficulties of mass production, similar operations are used in the manufacture of special crankshafts.

The X-ray has not been used in any of the subsequent manufactures, for once the principles were established with its aid, simple mechanical tests could be used for control. The X-ray work consisted of preparing a sample, running it on the diffraction equipment and then taking the finished photograph and examining it for "fuzzy" lines of the one-one-one-one type, indicating martensite, and lines of the two-one-two-one type, denoting austenite. While this is extremely simple and easy to perform, the investigation would have been impossible without the initial fundamental work of the physicists.

It may have been noticed that we do not mention the presence of carbides. These are not detected in

steels by X-ray methods, for the concentration of the carbides is too low. It is perhaps just as well for, as it is, the X-ray photograph shows (if alpha iron alone is present) only the presence of a single phase and the information is not confused by other lines. This means that we are investigating the essential iron structure and in the case of alloys, combinations of iron with other metals. The information obtainable from the study of the iron phase is extremely valuable, for it is susceptible to change by cold work, it changes with high temperatures and, in many cases where the cold work has been severe, the response to heat treatment is not complete and a banded or fibered structure still remains.

The term "banded" is used advisedly, as it is the term recognized by men in the mill and is synonymous with the word "fibered" or the phrase "preferentially oriented." Again in this case the theoretical considerations underlying the technique are largely geometrical and in many cases complicated.

(To be concluded)

Handling Pipe in Process at an Eastern Rolling Mill

(*Concluded from page* 1059)

pile and placed in the freight car in one operation.

Again referring to the drawing, the pipe is picked up at point 1, carried to point 2, and then up a 7-per cent grade, as indicated on track 3, and put down in storage under tracks 4 to 12. These tracks over storage are at a maximum elevation, so that as much pipe as possible can be stored in this single building.

Two cab-controlled hoisting units of 2 tons capacity equipped with electric motor drive capable of developing 300 ft. a minute travel speed were employed. All the curved sections of the rail were laid out on an 8-ft. radius, to permit high travel speeds. All the switches were equipped with special safety devices in the nature of auxiliary guards and spring bumpers, to eliminate danger, should one of the carriers run into a switch which was accidentally set against it.

Savings in time and labor, with a consequent reduction in handling costs, with this installation are obvious. Although no definite figures are available, it is understood that the handling costs have been reduced to about one-third. The conveying equipment was furnished and installed by the Cleveland Electric Tramrail Division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Better Enameled Goods at Lower Cost

(*Concluded from page* 1057)

are six steel tanks for cleaning and rinsing and a monel metal tank for the acid pickling solution. Work is handled in monel metal baskets.

From the last cleaning tank the baskets move on a roller conveyor a few feet into a 12 x 30-ft. gas-heated dryer having a capacity for eight baskets. Here the work is dried at a temperature of 300 to 400 deg., flat work being kept in the dryer 10 to 15 min. and formed pieces 40 to 50 min. From the dryer the baskets go to an adjoining heated storage room, 20 x 30 ft., where the work remains until it goes to the dip tanks. The storage room is heated by waste heat from the dryer. Warm air from near the roof of the dryer is blown into the pickling room, where it dries up the steam from the pickling tanks and in winter heats the room.

A feature of the mills used in grinding the enamel is that vulcanized rubber linings are provided on the surfaces of the cast steel charging covers, frames and draw-off cocks exposed within the mill, to assure a clean mixture. The pebbles have a tendency to grind off exposed metal, the particles becoming mixed with and discoloring the enamel. The remainder of the interior is protected from this grinding action by the usual porcelain lining.

Three Stages of Improvement of Blast Furnace Iron

LIGHT is thrown on the long-standing controversy over the relative merits of "direct" and mixer metal for iron castings, by a recent paper in *Stahl und Eisen* (July 3, 1930) by E. Piwowarsky. The author describes tests made in a plant whose product was ingot molds, and whose equipment consisted of a small blast furnace and a 150-ton mixer, the latter being fired with blast furnace gas.

Once each day for one week a 100-lb. sample was taken from a ladle as it was being filled at the furnace. Another similar test was taken from the same part of the same ladle at the time of pouring into the mixer, and a third from the mixer itself just before

Business as Others See It

Digest of Current Financial and Economic Opinion

DEPARTMENT store sales for the past two months have expanded somewhat more than seasonally, according to Harvard Economic Society. From Chicago comes the news that "distress merchandise" has practically disappeared from the market. Marshall Field & Co. have found manufacturers late in deliveries, because of shortage of raw materials, and believe that "the period of liquidation of merchandise stocks and commodity prices is about at an end."

Woolworth's "turning point" is reported to have been the week of Aug. 9. September sales were ahead of last year. Other chain stores are credited with higher September volume than in any previous year—despite price reductions which have been somewhat drastic in many cases. This means that large *quantities* of goods have been bought.

Savings bank deposits are piling up—to the embarrassment of the bankers, who find it hard to invest the money and have accordingly been lowering their interest rates. Presumably these savings increases have come partly from the lowered cost of living—affecting those of more or less "fixed" incomes. But the "buyers' strike" has had its share.

That this latter attitude must quickly be revised is the belief of La Salle Extension University, which finds inventories reduced, in practically all industries, from manufacturer to consumer. Depleted stocks must be replenished, "and we believe that the time is not far off." This organization voices a "hope for inspiration to develop industries so that our standards of living will not have to be lowered."

Do Textiles Point the Way Upward?

After reciting the disappointing features of the news of the past week, *Annalist* ventures the suggestion that the present upturn in textile manufacturing—cotton and silk particularly—may indicate the turning of the tide. "An outstanding characteristic of the recovery from the 1921 depression was that revival in the textile industries preceded recovery in business in general."

Political unrest abroad, continued draft of gold from distressed countries to France and the United States, collapse of the foreign bond market here—these are regarded by *Business Week* as the chief deterrent influences ahead of us in the winter months.

Decade of Declining Prices Foreseen

What is ahead for the "long pull" is becoming a matter of considerable interest. Silberling Research Corporation believes that "commodity prices will fluctuate, for some years to come, about a declining trend. The next *cyclical* movement will be upward, but this will not be indefinitely sustained. There will, over a decade, in all probability be a more marked downward *trend* in the prices of raw materials and foodstuffs."

This, it is believed, will be unsettling. "It will be necessary for manufacturers to lower [their] prices by reducing costs and increasing efficiency, if they hope to maintain volume and hence profits." The organization foresees an era of unusually rapid development in the mechanical arts and in the integration of business units into vast combinations. And a period of tariff wars is said to be ahead.

Against this look into the future, we have *Financial Chronicle* on business and spending habits. Discussing President Hoover's Cleveland speech, that paper says: "Older than a century of recurring panics and depressions is the truth that a man is entitled to buy and use what he can pay for. We have misused the power of credit, expanded it to the breaking point, and so used it in speculation and ill-advised extension (while all the time the old principles were working, principles of serious effort and sober living) that we brought on the 'retribution' he speaks of."

the metal was poured out for casting. These samples were cast both in dry sand and in warm iron molds, about 30 in. long and 1½ in. in diameter. They were then turned (after annealing the metal-cast tests) to about 1¼ in. and examined for variations in chemical composition, strength in bending, tension and compression, hardness and impact.

Some of the results are given in the table below. The drop in carbon is no doubt due to the tendency of the iron to precipitate flake graphite during cooling. There is also a slight dilution, due to the addition of 3 to 5 per cent of steel scrap in the mixer.

Chemical and Other Properties of the Three Irons

Chemical Compositions:	Sample at Blast Furnace	Into Mixer	Out of Mixer
Carbon, per cent	3.96	3.84	3.75
Silicon, per cent	2.14	2.18	2.15
Manganese, per cent	0.77	0.75	0.71
Phosphorus, per cent	0.081	0.082	0.090
Sulphur, per cent	0.024	0.027	0.031
Sand Cast Tests:			
Transverse strength	35,140	40,500	45,800
Tensile strength	17,200	19,500	21,800
Compressive strength	67,500	74,200	74,500
Brinell hardness	137	137	143
Repeated impact	206	210	358
Metal Cast Tests:			
Transverse strength	34,000	38,800	59,200
Tensile strength	16,000	17,400	26,200
Compressive strength	75,000	77,100	94,100
Brinell hardness	118	134	139
Repeated impact	26	118	610

It will be seen that there is uniform improvement as the metal advances through the process. This is due, says the author, to the agitation in the ladle, causing liberation of gases and graphite, and to superheating in the mixer. It will be observed that it is only at this stage that the metal-cast samples are superior to those cast in sand. The author explains this by saying that the harder skin is thicker in the case of the cleaner iron coming out of the mixer, and is therefore not entirely removed in turning down the samples.

It was found also that the metal cooled from 50 to 200 deg. F. between casting and pouring into the mixer. The variation depended, of course, on the length of time in the ladle, and on the amount of metal. During the 2 to 4 hr. in the mixer the temperature rose from 70 to 150 deg.

An annual yearbook, reaching 368 pages, has been issued by the Merchants Association of New York in the form of a trade directory of the city. It contains alphabetical and classified lists covering a total of more than 7000 names of leading corporations, firms and individuals in a myriad of business fields.

This Issue in Brief

Business depression has not slowed down road building. United States is spending two billions a year. A wide range of industries are benefiting, among them steel, metal-working and machinery.—Page 1121.

* * *

Unsatisfactory nitriding results are obtained when welded containers of carbon steel plate are used. The carbon steel nitrides and in time disintegrates.—Page 1125.

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Renitriding a denitrided surface presents serious difficulties. Renitriding will not raise the surface hardness materially. To obtain maximum hardness in renitriding, it is necessary to remove all of the denitrided case.—Page 1126.

* * *

Large forgings can be nitrided with the same good success as small forgings. Same procedure is followed. Forgings up to 3000 lb. are now nitrided.—Page 1127.

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"Pocket" motion picture camera more useful than blueprints in conveying to operators the method of doing a job. Eastman finds film valuable as a supplement to engineering specifications.—Page 1128.

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Paint-laden air from spray booths is drawn through excelsior-lined partitions and exhausted outside. Excelsior absorbs the paint.—Page 1129.

* * *

Failure of fans exhausting gases from japanning oven automatically shuts off gas supply, reducing fire hazard. In case of fire, Foamite is automatically sprayed into oven and fan motors stop.—Page 1131.

* * *

To get a good quality basic open-hearth steel, high-silicon, high-manganese basic pig iron is necessary. High silicon enables the heat to melt higher in carbon. High manganese makes a saving in manganese in final additions.—Page 1138.

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NEXT WEEK, the vitally important and highly timely subject of cost policies will be discussed by several industrial executives, in another Iron Age roundtable.

ALSO, the case of the new works' manager, who believes he can forthwith apply in his new berth the methods successful in his earlier connection, but who fails.

ALSO, the education of employees.

▼ ▼ ▼

To get accurate machine shop costs, the production center or machine-hour rate of overhead application is most consistent. A definite rate is applied for each machine in the shop.—Page 1132.

* * *

Shop manager can tell in an instant how much a certain machine was used in a given period. Mechanical tabulator sorts punched job time cards, shows percentage of idle time.—Page 1133.

* * *

Even the small shop needs some kind of work control. "Class-of-Order" report is the basis of a simple, satisfactory system. Job time cards are sorted by departments and by class of orders. They tell how much time was spent on job orders, stock orders, maintenance orders, etc.—Page 1135.

* * *

Mold life increased by using a mold with a heavy band around the top. Flutes taper gradually to a perfect circle at open end of the mold.—Page 1139.

Tungsten carbide has given General Motors poor results in the case of twist drills. And on some automatic screw machines the tools have failed because of chipping resulting from shock or intermittent cutting.—Page 1141.

* * *

How to eliminate tip-cracking in tungsten-carbide tools. Before mounting tungsten-carbide tips, remove the machining strains in the tool shanks. Pack the shank in a charcoal pot, heat to 1750 or 1800 deg. Fahr., allow to cool slowly.—Page 1141.

* * *

Efficiency rating determines the worker's pay. Deductions are made for poor quality, low output, and broken tools. Value of tool is reduced to hours and the hours are deducted from his efficiency record.—Page 1145.

* * *

Hollow girders in new A. O. Smith building will serve as ducts for heating, ventilating, plumbing, lighting and telephone systems, as well as steam power pipe, electric lines, oxygen lines, etc.—Page 1150.

* * *

Nitriding growth seems to be about the same regardless of the size of section. A 2-in. dia. round bar will expand about 0.002 in. in 80 hr. and a 5-in. round the same.—Page 1127.

* * *

Is too much time spent on small tool maintenance? Machine shop keeps a record of time spent on "salable" production and small tool maintenance. When latter is disproportionate correction measures are quickly taken.—Page 1134.

* * *

Tungsten carbide with strength equal to that of fully hardened high-speed steel is produced experimentally by sizing the carbide so that there is a minimum amount of cement between the grains. General Motors engineer believes that tungsten carbide will soon be made in different grades for different purposes.—Page 1142.

24" FAY AUTOMATIC LATHE

is used extensively in automotive work, but it also has a large field in other manufacture. In large pieces with large unit time it is economy to do small lots on a highly productive machine where possible, because, whereas the set up may run from 5 to 10 hours, the time of saving per piece is so great as to absorb that time in a very few pieces.

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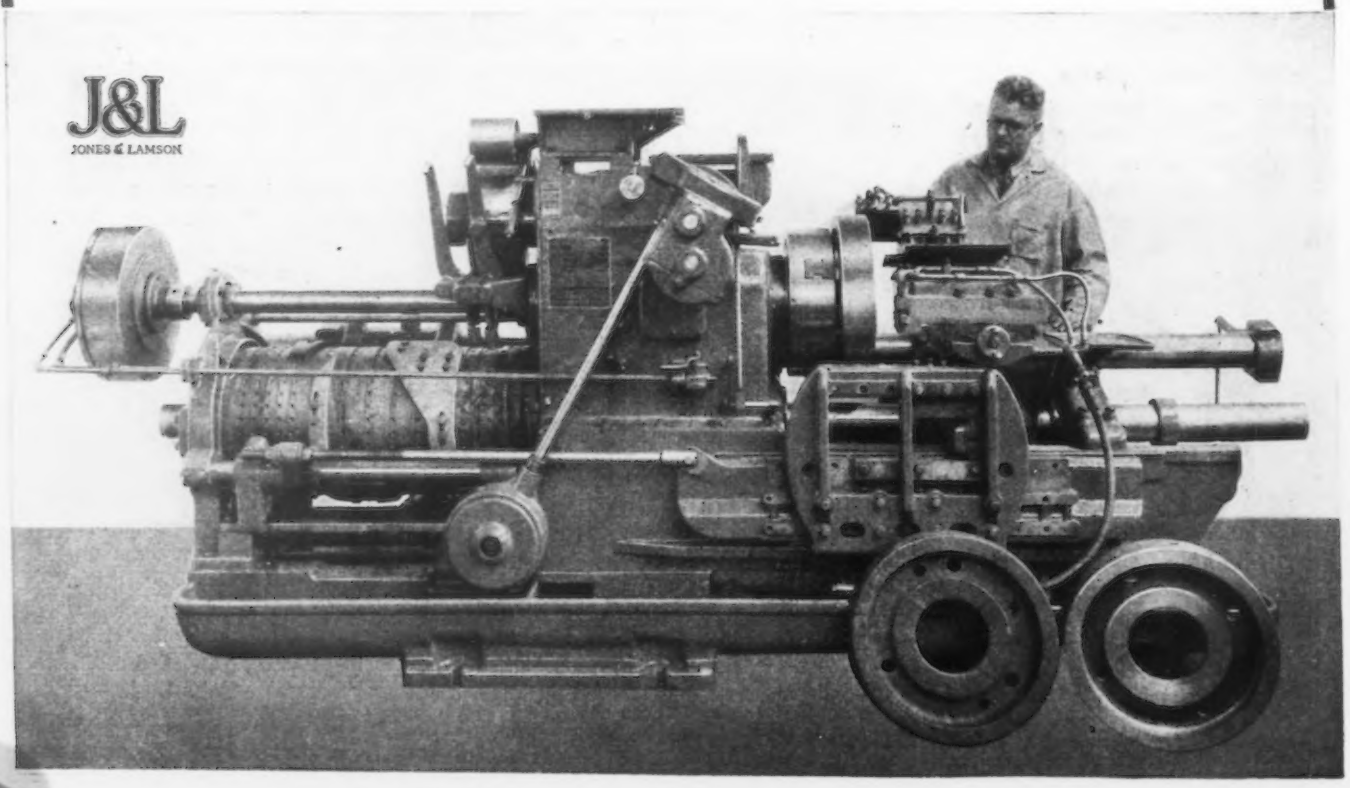
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